The Builder.

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Smokeless Heat.

THE Exhibition of Smoke-preventing Appliances at South Kensington, of which we gave some account in our last number, now presents an aspect entirely its own. Eminently and especially does it strike the visitor as a business affair. Not only is this the case with regard to the nature of the exhibits themselves, the enormous blocks of glittering coal, the metallic beauty of the samples of coke, the slow but unresting toil of the mechanical stokers, the repeated answers to the same questions, and attempts at the solution of the same problem, which have given a strong family likeness to the offspring of so many different minds, but the character of the exhibits seems reflected in the faces and behaviour of the visitors. Here you see the country clergyman earnestly studying a stove which, in his mind's eye, he has already fitted into his carefully-restored church. There it is the lecturer, the sanitary reformer, the medical man, who is chiefly bent on studying the union of the difficult aims of warming and ventilation. Through all these thronging groups of reasonably anxious faces peer the keen eyes of the salesmen, the inventors, the speculators. The glow and lustre of many of the furnaces, stoves, and gas-burners add a life to the whole scene, contrasting very forcibly, and very pleasantly (in the early part of the present week) with the keen wind, close drizzle, or clinging fog without. Whatever may spring from the exhibition, it has already established its character as an earnest and business-like scene.

It would be unjust alike to our readers and to the exhibitors to attempt to anticipate the verdicts which it will demand no small amount of care and competent skill to make the means of eliciting the best uses from this display. We mentioned in our former notice that a professional man (of whose valuable contributions to the library of the civil engineer we have had repeatedly to speak in terms of high commendation), has been appointed to superintend the trials, under the direction of the executive committee. We may be pardoned for the remark that, eminent as are some of the names on which the public are thus invited to rely, a more definite authority would perhaps have clothed the future utterances of the promoters of the exhibition if the form of a small scientific commission, charged definitively to report on the exhibits, had been adopted. Such is the mode usually employed abroad. In this country the public are beginning to fight somewhat shy of "committees"; and though it may be said that the difference between a committee and a commission is only in name, it may be replied that, even if so, it would be well to give to the public the more satisfactory name. But what we mean is something more essential. It is that the public ought to have it clearly impressed on them that no pains will be spared to bring out clearly, impartially, and scientifically the chemical, mechanical, and commercial values of the most deserving exhibits, and to do this, not only in a manner that will serve once for all, but so as to form a new chapter in the engineering history of the country.

We can imagine two men,—we may almost say the same man in two different states of mind, or of bodily health and comfort,—walking through the galleries, and summing up their impressions in two very opposite sentences. "Well," says the one on whom the weather, the tardiness of the train, or the late hour at which he went to bed on the previous night exerts a depressing influence, "what do we get from all this? Is there anything here that we did not know before,—in principle, at all events? Does any one think that London skies will be any the brighter for the lighting of so many additional fires at South Kensington?" "Well," says the other, who looks, habitually and happily, at the bright side of things, "it is really delightful to see how much intelligence has been devoted to the settlement of a great question of every-day mechanics. The way in which so many inventors have hit on the same idea shows how true that idea must be. Can there be any excuse for London remaining as black as it is? Is it not even already more free from fog than it was last year?" In fact, each of the two imaginary visitors would have uttered what was true; and if we were hard-pressed for an opinion we should say, "If England is to maintain her prosperity for another 500 years, we do not doubt that the skies of London will be purified from the noted canopy of smoke which forms the baldaquin of the royal city's seat. But we do look in a different direction from that indicated by [any single exhibit that caught our eyes at South Kensington for the efficient cause." We observe, however, that Dr. Siemens has not allowed the mode of employing electricity that was present in our thoughts to escape his attention, as will be seen from p. 96 of the Catalogue, describing an appliance that we were not fortunate enough to see at work.

Generally speaking, the attempts made by the inventors whose works are here collected may be divided into two main categories, viz.:—the use of smokeless fuel, and the improved use of fuel that is not smokeless. The third category,—that of the future,—barely represented at South Kensington, though the glowing platinum wire in several of the open grates might well have suggested the thought to the inventors,—would comprise the production of heat by dynamic energy, to which we confess that we look forward as hereafter certain, however long deferred that hereafter may be.

It must not be forgotten that while we possess a greater choice of fuel than most nations, we have deliberately, or, at all events, practically made choice of the most smoke-producing for our domestic use, and also that we generally burn this in the most wasteful and extravagant manner. What we seek for in fuel is not only heat; but, it must not be forgotten, a sort of cheerful companionship, the enjoyment of which has become a part of the national character. Here, in truth, lies the knot of the smoke question. Efficiency, economy, convenience, cleanliness, readiness at a moment's call,—all these things can be produced by other means, better than by burning the best flaming coal in an open grate. But so strong is the partiality for the companionship of the fire, that waste, inconvenience, dirt, and cost are,—we were going to say cheerfully,—incurred, rather than lose the fireside charm. We are not justifying the choice,—we only say that it *is* the choice of nine persons out of ten. Of all the reasons against the open fire it seems to us that the economic one is that on which most reliance will have to be placed. But here the most convenient, instant, cleanly, and, in some respects, efficient, mode of heating is not, apparently, the most economical.

The use of smokeless fuel is, of course, a more simple solution of the problem "How to abate London smoke," than any other. Without anticipating the report of the Executive Committee, we may say that we are inclined to give the preference to the class of exhibits illustrating this principle. And we shall look with interest for the exact details of those chamber-grates in which, with the addition of a very small dose of gas, anthracite coal is burned. There are three kinds of this pseudo-gas fire,—one in which all the heat comes from the gas; asbestos, or other non-wasting material, being kept at a glow in the grate, but not really adding to the production of heat. In the second, coke is used; the heat is great, but the fire looks dull. With anthracite there is cheerful flame, great heat, and no smoke. To this point, then, we call very serious attention.

And here we have to lament that the most formidable contributor to the coal merchant's bill, viz.,—the kitchen-fire,—has not, by any means, received proper attention on the part of the exhibitors. The cheapest, the most constant, the hottest for its consumption, and, in nine points out of ten, the best, kitchen-fire known in England and Wales, is not represented at South Kensington. It is one to which, not so very long since, we called attention in these columns, speaking from long and ample personal experience,—the ball-fire of Pembrokeshire. It is easy to understand the omission. But it is as unfortunate as it is capital, and it is one that

tends very much to strengthen the tone of the remarks previously made about the difference between committee and commission. The former will probably hold themselves bound only to report on actual exhibits, even if they give the time and attention necessary for that. Now, no tradesman or commercial exhibitor is likely to exhibit the Pembrokeshire ball fire, for the simple reason that he has nothing to gain by so doing. The grate is so simple,—the whole affair is so inartificial, that there is no money to be made out of it by an exhibitor. The only chance would be for some great mining company, or owner of vast stores of culm or anthracite coal dust, to send up the balls of clay and culm ready for use. And no doubt the picturesque little Welsh woman, whose tall hat and tidy jacket excited a sympathetic feeling of which gravity forbade the expression, would soon teach the executive committee how to "stum up a ball fire." Most imperfect is the exhibition, as a guide to domestic economy, until this be done. If London servants could be induced to use the Pembrokeshire fire in the kitchen, London smoke would at once be reduced by probably one half, and London coal-merchants' bills in an almost equal proportion.

But we must not omit a caution as to the great drawback in the use of anthracite coal. To the ordinary visitor to South Kensington the evil may not be apparent; but to the miner, or the person familiar with the Carmarthenshire or Pembrokeshire district, what we mean was very vividly recalled by the exhibition. As sources of heat, what struck us as the most effective in the galleries, were certain low, plain furnaces in which pure, unmixed anthracite was burning with intense glow and steady radiation. Nothing, it might be said, could be better, say for a hall fire, or for warming some great open building. But the genial glow radiated from these simple and admirable stoves is accompanied by an insidious soothing effect, against which no precaution should be neglected. Carbonic acid gas, the choke-damp of the mines, is so freely liberated from the steadily-burning anthracite, that in a small room, with doors and windows closed, we have not the smallest doubt that one of these furnaces would very rapidly prove fatal to a slumbering or inattentive inmate. This great danger attending on the use of this beautiful fuel demands the most careful attention.

Side by side with these effective anthracite furnaces we may mention one which seems to us to combine as many of the defects of this mode of burning as could well be. Many fire-bars hid most of the flame, decrepitation was loud and constant, and a heap of unburned coal accumulated under the grate as we stood by.

Of the use of gas alone as a fuel two exhibits deserve special attention. One is, the Siemens gas-furnace, supplied with a spit made to revolve by clockwork, which is run into a sort of metal baker's oven, heated by a row of gaslights on either side. As to this the test of actual cooking must be applied before it is possible to do more than point out the neatness and cleanliness of the arrangement. The question of cost has also to be elucidated.

The other, which struck us as not only original but beautiful, is the only rival that we have seen to the open drawing-room fire. We are aware that we speak of a matter of taste, and one as to which very conflicting judgments will probably be formed. We refer to the open fireplace of curved and burnished copper, which reflects the light and heat of a row of gaslights concealed from the eye. The effect is that of a magic furnace. It is possible that the eye would tire of the steady glow, as contrasted with that constant change in which many of us feel the chief charm of the drawing-room fire to lie. But we confess that we should much like to make a fair trial of this gas-stove, and also to know its cost, as compared with the production of equal heat from coal. As to ventilation, and as to purity from dust or any product of combustion, we are disposed to give a very high rank to this fireplace. Still there is something to be inquired into concerning it.

On the subject of combustion of gas, we shall be doing great service to the public by calling attention to the simple and excellent duplex gas-burner of Thomas Heron. We were perhaps led to dwell rather longer than might have otherwise been the case on this exhibit from the fact that the inventor had gone over ground which we had recently beaten; and that an unusually courteous and intelligent agent gave such a practical demonstration of the economy of gas and of light to be effected by the simple substitution of one of these burners for one of ordinary construction, as to render it unnecessary to wait for the report of the committee.

It is well known to those who have studied the subject,—being, indeed, the secret at the bottom of Mr. Sugg's great improvements in gas-lighting,—that by the ordinary mode of burning gas we obtain not more than perhaps an eighth part of its luminiferous power. The conditions under which the full power is to be educed are, first, the supply to the flame of the proper dose of warm air for combustion, neither too much nor too little; and, secondly, the delivery of the gas to the flame at a very low pressure. As to the first of these, a closed system attains the best result in the production of light; but, on the other hand, there is a loss of light in passing through glass. As to the second, we had the disappointment to find that our own invention of a small orifice admitting the gas into a hollow burner, whence it escaped by a larger opening, had been previously patented. Of this expedient Mr. Heron makes use, but instead of one, he uses, side by side, two batswing burners placed on a sort of capsule. The double flames warm and comfort one another, and to some degree act as does a closed system, while the pressure of the gas is brought down to an economical tension. The value of the process is demonstrated by the simple plan of bringing two jets together. And the question of quantity of gas, as compared to light, is beautifully illustrated by two little gasholders, placed side by side, and connected, one with a common, and the other with a duplex burner. A simple photometer measures the intensity of the shadow; an index shows the consumption of the gas. To show that all is fair, the connexions of burners and cylinder are reversed. With a much stronger light the duplex burner consumes not more than two-thirds of the supply of an ordinary bat's wing. As to the value of the duplex burner, it is thus competent to the ordinary visitor to form an accurate opinion by the use of his own judgment, if he gives time enough to apply the perfectly conclusive tests supplied by the exhibitor.

The above are some of the remarks which struck us with reference to the use of smokeless fuel. We must reserve any that occurred to us as to the question of appliances for the better consumption of flaming coal.

CHARTOGRAPHY AND EXPLORATION OF SYRIA AND PALESTINE.

A REDUCED copy of the 1-in. survey of Palestine, of which we gave a notice on the 17th of July, 1880, has been recently issued. For the ordinary student this smaller map, which is on the scale of three-eighths of an inch to the mile, will probably prove more convenient than the twenty-six sheets on the larger scale. For topographical research, indeed, the 1-in. scale has long been accepted as, all things considered, the best. But research of this kind is a speciality, —almost a speciality of the surveyor or the geographer. And on a $\frac{3}{8}$-in. scale it is practicable so to mount the map, either on a roller or folded in a case, as to keep the whole country before the eye of the student, a matter almost impracticable on the larger scale. In a university or public building, indeed, the large survey may be hung on the walls, as was the map of England on those of the Museum in Jermyn-street. But admirable as is the effect of such a display at a *conversazione*, or public meeting, or the like, its utility is more questionable. It is beyond the power of the ordinary unassisted eyesight to identify names on a map so exposed. An idea of the physical outline of the country, not altogether unlike that which is obtained from a lofty mountain, may be formed from the display; but this is all. And this idea, in the case of the Holy Land, would not be very much more distinct than that to be gained by a glance at the smaller map. In those portions of extraordinary hill shading which denote the ravines and cliffs running down to the valley of the Jordan, and bordering the Dead Sea, indeed, the rules of orographic representation make the smaller map much less effective than the larger. But, on the other hand, the former is engraved; and the advantage thus given, in clearness and beauty of designation, over the photo-zincographic method adopted in order to keep the price of the large map within moderate limits of price, is very conspicuous. For any but special students the $\frac{3}{8}$-in. map, consulted with the aid of the Bible Handbook, will meet every requirement, and bring as clearly before the imagination of the student of Scripture the localities, and even the chief physical features, of the scenes in which took place the events recorded in Holy Writ, as can well be done without actual pilgrimage to Palestine.

There is one point in which the new map tends rather to awaken than to satisfy curiosity. The eastern limit of the country delineated is formed by the western shores of the Dead Sea, of the Sea of Galilee, and of the Huleh lake, and by the course of the Jordan between these expansions of its waters, and to the north of the last-named lake. The line thus traced leaves a wide margin of undelineated ground within the border of the map, to the east of the river, except at about latitude 33° 25′, where the eastward trend of the river as its channel is traced upwards to Banias, makes a little inroad in the ruled margin of the map. The arrangement on paper is as good as the physical features of the ground admit; but the force with which the blank strip of paper appeals for support for the prosecution of the survey of Eastern Syria will, we hope, be found to be irresistible. As to this, the latest quarterly report of the Palestine Exploration Fund speaks of decided progress, although the presentation of the great map to the Sultan does not seem to have induced any great desire in the mind of his Highness to facilitate the further progress of exploration. It is much to be desired that no political difficulties should be allowed to hinder the prosecution of a research which is purely scientific. Any hesitation on the part of the Porte as to the wisdom of allowing such surveys of Palestine as may be of military value to be made by European engineers would be now quite out of date. We are far from denying that such considerations might have had some weight with many statesmen as to the survey of Palestine itself,—the ancient battle-ground of Egypt and Assyria, and later of the Cross and the Crescent. But this is now done. The survey is made, and we apprehend that there can be little doubt that full military details as to the country are in the possession of at least one intelligence department in Western Europe. The survey of Eastern Syria has by no means the military value which attaches to that of Palestine, and no well-grounded military or political objection can be raised to the completion of a survey from which the Porte itself would derive important information, which would be of little or no value, in case of war, to any unfriendly power.

Another point of extreme interest in the prosecution of the survey of Eastern Syria is hinted at in the above quoted report, and no doubt will receive full, and perhaps unexpected, elucidation. This is the occurrence of megalithic remains on the sites described in the Bible as those where were to be found the descendants of the giants. The remark is not altogether new. Several trilithons were known to exist in Syria, and three of them are engraved in the *Syrie Centrale* of Comte Melchior de Vogüé. Mr. Fergusson says as to them, "What interests us most at present is the knowledge that these Syrian examples are certainly sepulchral, and their form is thus another argument in favour of Stonehenge, if any were needed." Of the sepulchral character of the cromlech, composed of four upright and one covering stone, there is the evidence of the discovery of skeletons in such monuments, in which we think the bodies were entombed in a kneeling attitude. But there may be more question as to the trilithon; and as to those holed stones by which an oath was taken to the Norse gods by persons who joined their hands through the stone. Also the menhir, which is spoken of as a memorial stone, is considered by very competent judges to be a relic of that very ancient form of nature-worship which yet lingers in India, and as to the prevalence of which, in Eastern Syria, in early times, the prophets as well as the Pentateuch speak without any hesitation. In Mr. Fergusson's map designed to illustrate the distribution of dolmens, and the probable lines of the migrations of the dolmen builders, Es Salt and Heshbon, in Syria, are named, and marked with the red shading which is employed to designate the locality of megalithic remains. What the archæologist will now look with interest to be informed about is the nature, as well as the distribution, of the megalithic remains of Moab. Do we find there the whole series of these monuments,—the menhir, or upright stone; the trilithon, which may have been an altar; the holed stone, whether on a dolmen, forming part

of a trilithon, or single; the chamber or cromlech; the kistvaen, or smaller sepulchre; the circle of stones? It cannot fail to throw much light on a very interesting portion of the prehistoric monuments of mankind to learn what and what manner of these mysterious relics are found in the kingdom of Og,—the home of the remnants of the giants, and the sacred places of the worshippers of Baal Peor.

The latest announcement made by the Committee of the Fund gives reason for expecting very much of great interest on these points. It is, of course, only proper to wait for Lieut. Conder's own announcement both of his latest discoveries and of the inference which he draws from them. The work of the last few weeks, we are told, comprises 500 square miles of survey; the examination of 200 ruins, including that of a Sassanian building near Amman, which it will probably prove instructive to compare with the wonderful edifice found by Canon Tristram at Mashita; and some 400 cromlechs. These prehistoric remains are grouped around seven distinct centres. Menhirs, or standing stones, have also been found, and stone circles in connexion with both classes of monuments. Thus, as far as architecture is concerned, the few weeks of the exploration of Moab have already produced more fruit than a much longer period spent in the often-explored region of Palestine. The connexion between, at all events, one class of megalithic building and the rites of an early idolatrous worship will be illustrated. References in the sacred text which have lost any intelligible meaning from the adherence of the translators to the pointing of the Rabbis,—which usually is conducted on the principles of obscuring anything like plain truth,—are likely to be restored to their true historic import, and the latest Syrian building era of importance, that of the Saracens, will be illustrated by the comparison of the Sassanian building above mentioned, and also of an early Moslem mosque in Amman, with the Kubbet es Sakhra at Jerusalem.

MUNICH AND VENICE.

WE hear a great deal in the present day about wall-decoration and fresco-painting; the capital of King Ludwig was, as all know, foremost in the modern revival of the great art which once flourished so brilliantly in Italy; the results of that revival have long been familiar to the student of art history. It is, therefore, with no surprise that many will learn that the experiment of open-air fresco-painting is at length practically shown to be a failure; the wall pictures in the Hofgarten arcades have long been peeling off from the wall in spite of constant repair, and the task at length has been abandoned as hopeless. As for the fate of the frescoes on the New Pinakothek it has long been sealed. A patriotic effort has, however, we learn, been made to rescue from destruction the fresco decorations of the Isarthor, representing the entry of the Emperor Ludwig into Munich after the battle of Mühldorf, the work of Bernard von Nehers; we learn from the same source that the restoration promises technically to be successful, thanks to the use of a new process discovered by a local chemist, Herr Kain, and which, according to the opinion of competent authorities, can be relied upon for its power of endurance against exposure, being washable. It is only from an artistic point of view that the restorations would appear to be open to criticism, the tones of the original,—restored already a great many years ago,—having been seriously injured, a fact not difficult for those even at a distance to realise. In spite of all this, the visitor to Munich would scarcely believe that out-of-door decoration had been condemned; whether some of the frescoes which within a year or so have been boldly used to decorate the façades of several new houses in the Bavarian capital be painted in the new material we do not know, but the artists who have so generously beautified the city have singularly flown in the face of the fate which has overtaken the works of their predecessors. It is difficult, we suppose, at a night's journey from Venice and Verona, and the many other cities of Venetia where the houses still show brilliantly the frescoes of the sixteenth century, for the Munich artists to lay aside their dream of an ideal art-capital.

In the meantime, a city whose existence once realised that dream, Venice, would seem, from the accounts that reach us from certain quarters, to be doomed. More than one wail has already gone forth, supported, of course, by Byron's muse; but the lament against improvements arises from outsiders, who complacently visit the queen of the lagoons to admire its beauty and its past, while at home they never fail to heap upon its unhappy inhabitants abuse and pity for their squalor and misery; and when some slight effort is being made to rouse again the spirit of prosperity in the once-busy canal, there come forward the critics, who beg that England shall be called upon to prevent the steps taken by the municipality to stay at least the daily downward course of their unhappy city, to decently drain its houses, and ensure a proper water-supply. The question is, indeed, a difficult one. Is Venice to sink and sink to ruin to gratify the tastes of a few *dilettanti* travellers, or is she to make some effort to show herself worthy of her glorious past? This effort the authorities are making. In the first place, we learn that the question of the water-supply is practically solved, and in two years or so we shall hear no more reports of water-famine from the Rialto; while, in addition, an artesian well is being bored. Several of the more important thoroughfares are being, or have been, asphalted, planted with trees, and provided with seats; other thoroughfares (for Venice is not all canals) have been broadened, notably the Via del 22 Marzo, where a number of new buildings have been erected, which it is to be regretted, however, do not, from all accounts, possess any very great artistic character. Perhaps the most successful architectural work of modern Venice is allowed to be, not the Palazzo Franchetti, opposite the Belli, almost universally condemned; but the Cassa di Resparmio, or Savings Bank, the work of the architect Trevisanato, and which will complete the plan of the Piazza Manin. An excellent example has been given here by the adherence to the red tone given to its façade, resembling that of so many of the old palaces of Venice and the *terra firma*.

Now that the fierce heat of the public indignation expressed at the restoration of the façade of St. Mark's has cooled down, the work is being quietly continued, though happily, it may be stated, under the direction of a commission, with the assurance regarding the competency of which we must, we suppose, rest satisfied. Conservation and not restoration is the course being pursued, much greater care being observed than previous to the European remonstrance. The external mosaics are being, or have already been, attended to, as also the bas-reliefs inserted in the façade; at present we learn, from a correspondent of the *Zeitschrift für bildende Kunst*, that the two portals on the right are hidden by the hoarding behind which it is customary in Italy for work of this nature to be executed; at this angle of the façade there are, it will be remembered, not a few columns and supports out of the perpendicular. Interiorly the work of restoration is proceeding, in the baptistery and the Cappella Zeno. Among other works in progress, we are informed that the corner of the arcade of the Doge's Palace, towards the Molo, is at length freed from the scaffolding and hoarding which have so long concealed this angle of the beautiful edifice, and the long line of the capitals of the arcade pillars, — well known to those familiar with Venice, or indeed with Mr. Ruskin's "Stones of Venice," or the studies of the late Mr. Burges, — now stands in unbroken order. A report has reached us to the effect that some changes are being effected at the base of the Campanile, in the shape of restorations to Sansovino's charming *loggietta*, but the work is, we believe and trust, confined to some necessary repairs.

Memorial of Dean Stanley.—We understand that the form of memorial which is likely to be proposed is that of a monument comprising a recumbent figure, to be executed by an eminent sculptor, and placed near the grave in King Henry's VII.'s Chapel, as nearly as possible underneath the memorial window dedicated by the Dean to the memory of his wife, Lady Augusta Stanley. It is thought to be not unlikely that the outlay necessary for a monument of the kind may be defrayed by a large number of smaller contributions, and that enough may also be collected by individual or combined subscriptions to go far to fulfil a design constantly cherished by the late Dean,—that of completing the restoration of the ancient Chapter-house by filling in the windows with stained glass.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the ordinary general meeting of this Institute, held on Monday evening last, Professor T. Hayter Lewis, vice-president, in the chair, the minutes of the previous meeting were read and confirmed.

Illness of the President.

The Chairman.—With respect to the health of our President, as I need scarcely say, every one here is extremely anxious to know the worst, and therefore I am commissioned by the council to explain exactly the position of matters. I deeply regret to say that our President has indeed had a very severe attack of illness. At first the symptoms were very serious, but I have the greatest possible pleasure in saying that Mr. Street is now better, and I cannot do better than read to you a letter which I have received from his son, Mr. Arthur Street, who, in answer to our latest inquiries as to his father's health, writes:—"I am happy to say that I can give a decidedly satisfactory account of his progress. He has been sickening for his illness for so many months that it is natural we should look to a rather slow recovery; still, perfect rest for a time will, no doubt, restore him to perfect health." I may add that I have seen Mr. Street, and he is now about to seek rest and change, at the suggestion of his medical advisers, abroad, —possibly he may go as far as Egypt. At all events, he will take sufficient rest, so that we may hope after due time to again see him amongst us the earnest hard-worker that he was, perfectly restored to health.

Prospective New Members.

The Secretary read the names of a great number of candidates for membership who had been approved by the council. The list included fifteen or sixteen applications to become Fellows of the Institute; nearly a hundred applications from gentlemen desirous of becoming Associates; and five applications for Honorary Associateship.

Native Buildings on the Gold Coast.

The first paper read was entitled "Notes on the Native Buildings on the Gold Coast," by Major Bale, Associate. The author observed that all native buildings on the Gold Coast and far into the interior of that part of the African continent, are constructed of materials at hand and readily adapted to the situation. At Cape Coast Castle flat roofs for catching rain-water were common, and indeed necessary, as no good water was to be had nearer than the Sweet River, six miles further off. In the town of Elmina the houses were, for the most part, thatched. The walls of the huts were of clay or "swish," kneaded and placed round upright poles obtained from the forests. Some of the clay was very ochreous, and yielded, with very little manipulation, a very good ochre. The houses or huts were built by female labourers, nearly every one of them with a baby on her back. Where cracks showed themselves in the clay walls, as they invariably did after a short time, they were puttied up with "swish." All partition walls were carried up from the ground right through the roof, dividing the roof into sections or compartments, the divisions being provided with water-channels where necessary. In elevation the native huts often have a breadth of effect almost amounting to repose and dignity. Some of the details, such as cornices (or, rather, their equivalents) were of small slack-burnt bricks, cemented together with "swish." These bricks were burnt in kilns fired with brush-wood. There was a composite class of houses, built of forest-poles tied together with monkey-ropes or withes from the forest. The natives had no idea of tying a lashing properly, but they twisted the withes when wet round the poles, and when they dried, their shrinkage held the timbers firmly together. Laths of split bamboo were tied on horizontally between the framing, and over them "swish" was floated by means of bamboo floats. Huts of this class were generally provided with window-blinds, and the door-openings were covered by means of mats made of bamboo and coarse grass. The roofs were of thatch. Sometimes they were built with gables, and sometimes provided with a chimney on the gable to carry off the smoke from the fire, which latter was simply laid on the floor of the hut. It was remarkable that some of the native buildings were almost

identical in design with the stone buildings of ancient Egypt. Most of the outer walls were built with a batter, although the overhanging cornice was omitted. The question naturally arose, Did the ancient Egyptians merely reproduce in stone and granite a style of building similar to that now to be found on the Gold Coast, just as the Greeks reproduced in marble the features of antecedent wooden buildings? Sir Gardner Wilkinson seemed to be very much of that opinion. Unfortunately, the natives of the Gold Coast, like nearly all African peoples, had no history, only traditions. They were mentioned by writers of antiquity, but were lost sight of until the Portuguese re-discovered them. The Phœnicians traded with them, and, according to Herodotus, some of them were employed in the building of Solomon's Temple. However that might be, it was extremely likely that a great deal of the gold and ivory used in the Temple came from the neighbourhood of the Gold Coast. The first European explorers of the country were the Portuguese, who built the Castle of St. George d'Elmina in 1481, and subsequently Cape Coast Castle and other castles were erected. The features of all these castles showed them to be Portuguese work. They were built wholly of random rubble-work in stone, cemented with "swish," and the surface rendered with mortar. It was from the Portuguese that the African first learnt to build in stone. The flat roof was adopted by the Portuguese and Dutch, but discontinued by some of the English, who sometimes used roofs that succumbed to the weather like umbrellas in March or April. Some of the natives had used corrugated iron roofs over mud huts! The Africans had learnt very little since the Portuguese left them. In every one of the Portuguese forts the principal apartment was devoted to the purposes of a chapel, but the Dutch, French, and English neglected this, amongst other things. The natives were now totally uninstructed in the technical arts of the European traders. None of them had the remotest idea of a truss for a roof, or the simplest notion of construction, yet, with persistent and practical teaching, they were, he thought, capable of becoming very good workmen. The late Major Home was also of the same opinion.

The Works of the late Major Mant, R.E.

Mr. R. Phené Spiers read the second paper, which was "On the Works of the late Major Mant, R.E., Fellow." Mr. Spiers observed that the architectural works designed and carried out by Major Mant were of so special and important a character that some notice of them would be of interest. Major Mant joined the service in 1857, being then about nineteen years of age. He went to India in the latter part of the year 1859, where his promotion was rapid, and where he soon began to turn his attention to the practice of architecture. He was elected a Fellow of the Institute in May last, being the first Fellow who belonged to the Royal Engineers. He designed and superintended many of the most important buildings which have been erected in India during the last twenty years. His first work was at Surat, which was in a style partaking of Gothic, but soon after this his attention appeared to have been directed to the study of the indigenous buildings of the country, and it was in a style developed by him on the basis of that of the native structures, and to which he gave the name of Hindoo-Saracenic, that his most important buildings were erected. The Town-hall at Kholapore, the High Schools at Bhownuggur and Kholapore, and the monument to the Rajah of Kholapore, were among Major Mant's works next referred to. The working drawings of some of these buildings were prepared by him in England during an extension of furlough. The secret of his mastery of the details of the style in which he worked was, that he made himself thoroughly acquainted with the workmen, his linguistic attainments being, of course, of great service to him. He engaged and trained a staff of native draughtsmen to work out his designs in detail, he, of course, being responsible for the plan and general *ensemble*. The buildings which he carried out were, as a rule, totally different, in regard to the requirements to be met, from the buildings from which he derived his inspiration with respect to style. His first buildings were so successful that he soon had an extensive practice, and he was so fortunate as to attract the attention of Sir Richard Temple, the Lieutenant-Governor of Bengal. Subsequently, when Sir Richard Temple became Governor of Bombay, Mant followed his patron to that Presidency, and about the same time designed and carried out the College at Dacca. He made two designs for the Mayo College at Ajmere in 1876, the smallest of which was being carried out, and in the same year he erected the Hospital and Library at Baroda, at a cost of 30,000*l*. In 1878 he commenced the Hospital at Kholapore. His three chief works, however, were the palace for the Gaikwar of Baroda, the palace for the Rajah of Kholapore, and the palace for the Maharajah of Durbhunga. The designs for the latter were not completed at the time of Major Mant's death. Its cost was estimated at 180,000*l*. The palace at Baroda, which was now being carried out at a cost of 200,000*l*., had a principal façade 530 ft. in length. In plan it was divided, roughly speaking, into three blocks, the central portion containing the Gaikwar's residence, the left-hand portion the Durbar and state rooms, and the right-hand portion the zenana, or ladies' part of the house. The Durbar hall was an immense apartment rising through two stories of the palace, with carriage-porch and colonnades. In construction the main walls were of brick faced with vitreous sandstone of different colours. It is proposed to use marble for the domes and principal architectural adornments. The Kholapore palace was not so large as the one just referred to, but would cost 65,000*l*., and covers an area of 100,000 square feet. In conclusion, Mr. Spiers alluded in feeling terms to the circumstances attending the sad death of Major Mant, who died by his own hand during a fit of temporary insanity.

In the discussion which followed,

The Chairman said that he was afraid there were no gentlemen present (except Major Bale) who had studied building on the Gold Coast, and if no one wished to speak on that paper he would at once call upon Major Morant to speak upon Mr. Spiers's paper.

Major Morant said he must first of all thank Mr. Spiers for his very generous notice of the life and works of his (Major Morant's) brother officer and friend. There could be no doubt, he thought, that Major Mant's buildings had been very successful, especially since he abandoned the Gothic style, which was unsuited to the country. Major Mant's greatest successes dated from the time when he adopted a style founded on the styles indigenous to the country, which styles were capable of easily lending themselves to meet modern necessities in domestic and public buildings for India. Of course the Hindoo and Mahomedan builders were more lavish of ornament then it was necessary or even desirable for a European architect of the present day to be, but Major Mant had shown that it was quite possible to preserve the feeling of the native styles even while limiting the amount of ornamentation. In considering the merits of modern works of architecture in India, it should be remembered that it was often necessary that their architects should act as builders and carry out their designs themselves, sometimes even having to make their own bricks and procure their own timber. Although this plan had its advantages, it made success more difficult of attainment. There was a great opening for architects in India, and he was quite sure that if any members of the Institute went out there they would receive as generous treatment at the hands of the Engineers as Major Mant had received at the hands of Mr. Spiers.

Sir Richard Temple said he had great pleasure in bearing testimony to Major Mant's ability as an architect, and to his good qualities as a man and a public officer. A more talented, accomplished, and conscientious Engineer officer never served in India. His career marked an important episode in the history of architecture and engineering in India. The British rulers of India inherited from their native predecessors a very fine architecture, but they went on for nearly a century building structures which, instead of having a civilising effect upon their subject populations, were most barbarous and demoralising in their results. He was glad to say, however, that during the last century we had become cognisant of our defects in this respect, and had built and were building structures which were in some degree worthy of us as a civilised power. In most of the capitals we had produced architects of eminence, amongst whom he might name Mr. Granville and Mr. Bayne at Calcutta, Mr. Chisholm at Madras, and Major Wilkins, Major Fuller, and Major Morant at Bombay. He thought that one reason why our Anglo-Indian architecture had hitherto languished was that there had been no proper technical education in architecture among the civil and military engineers who went to India. He did not say this with a view to disparage the engineers, for whose skill and scientific knowledge he had a great admiration; but artistic taste had not yet become a characteristic of the works done by the engineers as a class. Such men as Major Mant were in this respect exceptionally valuable, and therefore it was that his loss was almost irreparable. In respect of taste, imagination, and of everything that related to beauty and sublimity and to æsthetic culture, — he did not use that word in its present debased sense, but in its high and true sense, — the natives of India far surpassed us. English architects who wished to have their taste refined, their imagination lifted, and their thoughts elevated, should visit India, especially Agra, Delhi, and some other of the places mentioned by Mr. Spiers. As regarded Major Mant's works, their distinguishing merits were that whereas some of his architectural predecessors transplanted bodily to India European styles, and had especially tried to naturalise Gothic in an uncongenial soil, he endeavoured to hit upon some style which should unite the usefulness as to practical requirements which characterised European buildings, with the taste of the native style, and the style which was the outcome of those efforts he called the Hindoo-Saracenic. He seemed to have gradually arrived at that conclusion, for his earlier works partook considerably of a Gothic feeling. If he had one defect as an architect it was that he sometimes omitted to give to his buildings sufficient simplicity and grandeur. They were perhaps a little too much overlaid with details, and sometimes without any grand, striking, or dominant feature. As regarded the native architecture of India, he (the speaker) thought that all the members who could do so should take the earliest opportunity of visiting that most interesting country. There were to be seen not only one style, but many. There were the Buddhist style, the Hindoo style, the modern Hindoo style, and the Mahomedan style, which latter culminated in India under the Great Mogul, who was perhaps the greatest architectural genius who ever lived, not excepting the ancient Greeks. The buildings which he erected were still the peerless structures of the world. Whatever idea the members of the Institute might have formed of the marble structures of Europe, of Milan Cathedral and the like, they would find, if they visited India, that those buildings would pale their ineffectual beauties before the magnificent structures at Agra. He thought it a very happy augury for architecture and art in India that Major Mant's works had been brought to the notice of English architects by Mr. Spiers. Mant was a born genius, for, brought up as a civil and military engineer, he had excelled in architecture without any of the many advantages which the members of the architectural profession now enjoyed. His loss, though not, perhaps, altogether irreparable, could not be repaired, he was certain, from the resources available to the Government in India, and therefore he hoped that if the high and noble work in which Mant was engaged was to be properly carried on, the Government would go to the fountain-head and to the right source by inducing some of the best men in the Institute to go out to India.

Sir Andrew Clarke said that perhaps Major Mant's greatest work would be the College at Ajmere. When the designs for it came up to him from Major Mant, he (Sir Andrew) used the whole of his authority with the view of getting the work carried out in its integrity in accordance with the design. But the "everlasting rupee" caused him to be overruled, and the prominent feature of the design was ruthlessly struck out by the financial minister of the day. Among rising architects in India other than those already named in the course of the discussion, he might name Captain Cole, son of Sir Henry Cole. As regarded the native workmen, he did not think that much assistance was to be expected from them. So far as his investigations had led him, the Indian structures which had been so highly extolled by Sir Richard Temple were the work of European architects and workmen. Round about Agra were to be seen at the present time the tombstones of numbers of Italians who were engaged in carrying out the details of the buildings in question. He did not believe these details were the work of natives, for though the latter were very

patient and conscientious labourers when engaged to work out the designs of others, they were incapable of originating designs of their own.

Sir Joseph Fayrer said that from a hygienic point of view the buildings erected in the native style were far to be preferred to the buildings in the Gothic style which had been erected of late years.

The Chairman, in moving a vote of thanks to Major Bale and Mr. Spiers for their papers, said, with regard to the question of style, that if the English rulers of India adopted, as had been suggested, the native style for their buildings, instead of erecting the buildings they required in their own national style, they would prove an exception to the almost general rule which had prevailed amongst other great colonising nations.

THE NEW CRIMINAL TRIBUNAL IN BERLIN.

THE new buildings at Moabit, near Berlin, for the criminal tribunal, and for the detention of prisoners awaiting trial, were opened on September 16th, after having been over four years in course of construction. The total estimate was 7,000,000 marks (350,000*l.*), and the actual expenditure has been less. This result is attributed to the careful supervision of the principal architect, Herr Herrmann, and of his assistants, Herr Lorenz and Herr Reimann. The cost of construction has been less comparatively than that of any public work of magnitude recently executed in Berlin.

The architecture of the building devoted to the business of the tribunal is in a semi-circular arched style. The plinths, mouldings, and window-dressings, &c., are executed in sandstone, while the remainder of the work is in brown Lauban facing bricks. The two towers, which are on the right and left at the main front, give to the building a monumental character. Above the chief entrance it is proposed to place representations of four Prussian regents who were noted for the interest they took in judicial matters. The decorative effect of the entrance is materially heightened by allegorical statues of an appropriate character. Through the chief entrance an open gallery is reached which leads to the spacious ante-room of the building. From this branch off the different passages communicating with the offices, and from it also rises the chief staircase. In the basement (besides the apartments of the porters and house-servants), is the *depositorium*, or room in which objects of value taken from thieves (or which have been found and are supposed to have been stolen), are placed for safe-keeping.

On the ground-floor are forty-eight rooms, including six session-chambers for the magistrates, with the adjoining consulting-rooms, waiting-rooms, and messengers' offices; the president's room, ten offices for the clerks, secretaries' and advocates' rooms, &c. The first floor is devoted to the jury courts. One is a room measuring about 200 square yards, intended for ordinary occasions. A larger hall, measuring nearly 300 square yards, is not yet completed, but is being fitted up with much taste, and is to be expressly devoted to such trials as are of special interest, and are likely to attract a large attendance of the general public. Cells for prisoners awaiting their turn for trial are also on this floor, as well as the library and other offices in connexion with the procedure of the criminal tribunal. On the second floor are the rooms of the public prosecutor, the investigating judges, the accountants of the court, and heads of different other branches. In the entire building under notice there are 170 rooms. The corridors are mostly paved with Mettlach tiles, but partly with artificial granite, and have vaulted ceilings. The staircases are of fireproof construction. The general arrangement of the building is described as combining simplicity with artistic taste.

The female prison is situated in close proximity to the building of the tribunal, and contains sixty-four separate cells, as well as common rooms, for 150 prisoners. All the isolated cells and corridors have vaulted ceilings, and the staircases are fireproof. The building is constructed of ordinary bricks, and is four stories high.

The men's prison had to be constructed with a view to having as large a number of separate cells as possible, most of the inmates being not yet convicted, and, therefore, for many reasons, having to be confined separately. Thus the number of cells is 712, and there are, in addition, common rooms for 200 prisoners. There are also 40 rooms for overseers, sleeping accommodation for sixty attendants, a chapel, bath-rooms, and other offices. The building is described as being four stories high, and as consisting of five wings, which radiate from the central hall. The construction is said to be similar to that of kindred institutions, built on the cell system. From the wide corridors on the ground-floor, the gates lead right and left to the cells in each wing, access to the other stories being obtained by open ironwork galleries. There are bridges to connect the two ranges of galleries in each wing. The whole can be overlooked by the central overseer. The corridors, galleries, and central hall are lighted from above. Each cell is 4½ yards long, 2⅔ yards wide, and 3⅜ yards in height, thus containing about 36 cubic yards of air. The arrangement of the cells is not materially different from that of an ordinary prison. The bed can be folded up against the wall, as also can the small table provided. A cast-iron closet, with flushing apparatus, is near the door; and the appliances for heating and ventilation complete the contents of the cells. A small number of cells of a better class are provided for use in exceptional cases, and are found in a supplementary men's prison, on the ground-floor. The infirmary, arranged for forty-one patients, is on the first floor of the same building. There are also buildings for the residence of the officials. The cooking and washing arrangements are on a large scale, but space precludes our describing these points in detail.

The liquid sewage from the entire establishment is (after disinfection) carried on by a subterranean network of drains to the river Spree, while all other accumulations are periodically removed. These measures are only regarded as temporary, as the whole building will be connected with the drainage system of Moabit as soon as the latter is completed.

The heating of the tribunal building is effected on a new system, which is described as a combination of steam and hot-water heating. The stoves in various parts of the building are constructed to hold water, and are half filled. When a valve is opened, steam is admitted into a spiral pipe, which communicates its heat to the water. The upper part of the stove is, therefore, not filled with steam until the water in the lower part is at boiling point, and when a room has been sufficiently heated the steam is shut off, and the water retains heat for hours. Thus the hot water does not circulate, but is heated in the respective rooms. As the management of the valves requires care, and those unacquainted with them might cause injury to the apparatus, they are all controlled from the basement by an engineer. Speaking-pipes communicate with the basement from the various parts of the building, and there is, therefore, no real inconvenience caused by the distance of the heat-regulating apparatus. Some of the halls are, however, heated with warm air. The prisons have hot-water pipes in each cell, and the pipes are so arranged that heating of the different parts of the building can be separately controlled. The central hall and the chapel of the men's prison are heated by warm air.

The ventilation is arranged on a practical scale. In the jury courts allowance is made for the air being renewed to the extent of 33 cubic yards per hour for each person present, even supposing the parts reserved for witnesses and for the public to be quite full. In winter the air is warmed before it reaches the halls. In the cells a renewal of air, at the rate of about 26 cubic yards per hour, takes place. Each closet has also a special ventilation-pipe.

The site occupies about 48,000 square yards, of which about 16,000 are covered by the buildings erected.

Society of Painter-Etchers.—The Exhibition of this Society for 1882, will be held in London, and will open on the 1st and close on the 30th of April next. All forms of engraving on metal, whether by the burin, the etching-needle, by mezzotint or aquatint, or by whatever other process the artist may choose as a means of original expression, are understood to be included in the term "Painter Etching," and, subject to the approval of the Council, are eligible for exhibition; whether the artist sending them be a Fellow of the Society or not. All works intended for exhibition must be forwarded (suitably framed) on or before the 5th March, 1882, to Messrs. Hogarth & Sons, 96, Mount-street, Grosvenor-square.

THE PIER TURRET, DOVER.

THE turret which has been erected by the Government at the end of the Admiralty Pier at Dover is now virtually completed. The works were commenced in June, 1879, and nothing now remains to be done except to carry out a few minor details. The whole of the work is of a most substantial character, and being the first turret constructed in England for land defences, its progress has been watched with considerable interest.

The fort is constructed at the extreme end of the pier, which has been considerably strengthened by additional granite and concrete blocks in order to procure greater solidity and resisting power, while the turret itself, which is erected above the pier,—that is, rises from the level,—is completely encased, below the embrasures, by a very thick granite wall. This extends all the way round, the entrance to the fort being constructed, as it were, in the wall, so that an observer cannot fail to be impressed with its great strength and security of appearance. Indeed, so much scientific skill has been brought to bear upon the works by Captain English and other well-known engineers, that the whole structure may be regarded as a compact machine, and it is doubted whether an enemy's vessel would ever stand a chance of escaping destruction within its range.

Such is a general outline of the works as they are seen above the pier. The underground chambers for the ammunition and the engine-room are constructed beneath the turret in the solid masonry, and are very beautifully arranged. The engine-room is situated just inside the fort, and is approached through a small manhole. It is a comparatively spacious apartment, having a depth of about 20 ft., but is somewhat irregular in its other measurements. However, there is none too much room for the large quantity of machinery which it contains. The chamber is lighted with gas, and is ventilated by means of a pair of Hodson's patent rotary engines. These, however, will probably be dispensed with later on, and the machinery connected with the ventilating apparatus worked by one of the other engines. This chamber is excavated from 4 ft. to 6 ft. below high-water mark, but the floor and sides to the depth of about 6 ft. are protected by cast-iron checker plating. In the limited space of this apartment there are not less than three distinct pairs of engines, besides those already mentioned. The turret is driven by a pair of engines 80-horse power nominal, while a pair of 16 nominal horse-power engines are provided for adjusting purposes, either of which can be connected with the gear of the turret at a moment's notice by means of a very neatly-arranged break. A pair of engines 16-horse power nominal are also provided for loading purposes. They are connected by shafting with the loading-chamber, and will be employed for raising the ammunition to the muzzle of the guns. Steam is generated in two large tubular boilers on the locomotive principle, and the whole of the machinery and turret is now set in motion every other day, a rule which is likely to be maintained for the purpose of keeping the parts in working order. The fuel is supplied through a coal-bunker in the roof at the head of the two boilers, which latter are situated in a sort of recess apart from the other machinery. Running from the north-eastern end of the chamber is a passage cut in the stonework and leading to the centre of the turret, through which the gear of the machinery passes to the loading-chamber and the fighting-deck. Through here also passes the gear of the indicators. One of these instruments is placed in the engine-room and another at the "conning" hole, where the officer in charge of the gun is stationed, and they are so beautifully arranged that they not only show to a degree the position in which the turret is required, but they also indicate the exact position into which it has been placed after it has been trained.

The ammunition-chambers are similarly excavated, but quite apart from the engine-room, and, like the latter, they, too, are approached through a manhole in the surface. After descending, the visitor traverses a somewhat circuitous passage, scarcely wide enough for two persons to pass abreast, which terminates at the chambers. There are two or three of these chambers, all communicating with each other. The total length of the whole of these excavations is about 40 ft. They are from 8 ft. to 10 ft. deep, with a width of upwards of 12 ft., are constructed in the centre of the solid masonry of

the pierhead, and are surrounded by walls of such immense thickness as to render it practically impossible for any projectile to dismantle them. The loading-chamber is on the level of the pier, and has nothing of a very interesting character about it. Several details connected with it are not yet finished.

But the most interesting part of the work consists in the turret itself. It is the first land-turret which has been constructed, and is calculated to be one of the strongest forts in the kingdom. The shield of armour-plating with which it is encased consists of alternate layers of teak and iron. It commences on the inside with a skin of teak, 1 in. in thickness; against this is a 7-in. armour-plate, and then alternate linings of four thicknesses of 1¼-in. teak, and two 7-in. armour-plates. The whole of these plates rest on a platform, and are held together by 3¼-in. bolts, fastened on the inside, the total thickness of the shield being 2 ft. 8 in. With the exception of the embrasures, or port-holes, the turret is thus completely sealed. The "fighting-deck" measures 32 ft. in diameter, and is entered through a manhole in the floor, of which there is one on either side of the chamber. Both gun-carriages are now in their positions, but there is still a considerable amount of work connected with them necessary to be done before the guns can be mounted. It is very easy to see that when the two guns are mounted there will be very little room to spare. Everything is calculated with great nicety. Just sufficient room is left for the recoil, and the roof is constructed with a double arch so as to admit of the gun being tilted to receive the charge. The framework of the roof is formed of main and cross-iron girders of great strength, which will be covered by stout iron plating, but at present the roof is only temporarily enclosed, the permanent work having been removed to admit of the reception of the gun and gun-carriages. The roof is also constructed with a bomb-proof grating over the breach of the guns to provide for the escape of any smoke emitted into the turret when they are discharged. The guns will be fired by electricity, and it is calculated that they will throw a projectile of 1,700 lb. a distance of nearly 10 miles.

Some idea of the strength and proportions of the turret may be gathered when it is stated that the total weight of iron used in its construction exceeds 550 tons, so that when the guns are mounted there will be very little short of some 800 tons of metal. Some of the armour-plates of which the shield is formed alone weighed from 14 tons to 20 tons; and yet with all this dead weight the whole fabric is set in motion at a moment's notice as though it were a mere toy.

The turret was erected by the Thames Iron-work Company.

ON THE SYMBOLISM OF THE CHURCHES OF BORNHOLM.

BY EDWARD DOBSON, M. INST. C.E.*

In a lecture I had lately the honour of giving before the Philosophical Institute of Canterbury, I pointed out that the study of ancient buildings embraced three classes of considerations, viz.:—

1. The object for which they were erected.

2. The material of which they were constructed.

3. The canon of proportion; or, to borrow a musical term, the "motive" of their design.

I propose to take up some twenty minutes of your time with a few remarks under the last of these three heads, for the purpose of pointing out the manner in which the equilateral triangle furnished the canon of proportion for the Pointed style of architecture, and in what sense this style is essentially and exceptionally Christian.

Following, again, the triple division, which seems to follow a natural law, we may class every building under some one of these heads, viz.:—

1. Buildings erected without any design at all; in fact, unprincipled, though not necessarily bad, buildings.

2. All those structures which have been designed upon some leading principle or canon of proportion, which may be either,—*a.* Utilitarian; *b.* Constructive; *c.* Scientific; *d.* Æsthetic; or *e.* Religious.

3, and lastly. There is a class sufficiently numerous in all countries, composed of buildings erected in imitation of others built upon designs the meaning of which has been lost or forgotten.

A few examples in illustration of this classification will explain my meaning, and help us to understand what is to follow.

There is an often-told story, which, however, will bear repeating, of a contractor who had successfully erected a number of buildings without working drawings or any other designs but those in his own head, who, on one occasion, found to his disgust that he had left insufficient headway for the staircase of an important public building then in course of erection by him, when he swore by all the saints in his calendar that he would never again build a staircase without first "chalking it out on the wall." This is a perfect instance of what I have just referred to as an "unprincipled" building.

Take, as the antithesis to this, the Parthenon at Athens, which, of all known buildings, is one which exhibits æsthetic design carried to its highest point of perfection. I use the term "æsthetic," because it does not seem that the elaborately worked-out scheme of design referred to had any other object than the satisfying a subtle sense of beauty. Not only is the design of this temple such that both the ground-plans and the elevations must have been most carefully worked out in detail on drawings made to a large scale; but the lines which in ordinary buildings are horizontal are in this building all curved. This is the case with the steps leading to the porticos and with the lines of the entablature. And I would call your attention to the result of this system of curved lines, viz., that the joints of the masonry were radiating and not vertical planes, so that every stone in the entablature had to be designed and cut to fit its own particular position in the structure, and could be placed nowhere else.

As an example of the utilitarian principle in design, we may instance the complicated fortifications of the French and Italian engineers, the triple series of zigzag walls which formed the defence of the old Peruvian town of Cusco, and even the walls of the time-honoured fortress of Mycenæ, which showed that even at that remote prehistoric period the principle of flank defence was understood and acted upon. So in Mediæval fortresses constructed before the use of gunpowder, the battlements are made to project before the line of the wall, carried on stone brackets, between which were apertures, through which stones, melted lead, and missiles of all descriptions could be dropped on the assailants below, thus giving a vertical, as distinguished from a flank, defence.

In modern villas, built in what is facetiously called the "Castellated" style, we often see this style of parapet imitated at considerable expense as a mere meaningless ornament, perhaps masking a 14-in. lead gutter, and overhanging a conservatory whose fair owner, as she waters her flowers, thinks of nothing less than the uses for which these parapets were originally designed.

The constructive element enters largely into the principle of design. As a general rule we find that the stone architecture of Egypt, Persia, India, and Greece is based upon wooden types which must have attained a high degree of development. Take, for example, the tombs still existing in Lycia, in Asia Minor. Although built of stone they are simply imitations of wood construction, the notching of the beams upon each other being exactly imitated as well as the round poles forming the roof, as in the Turkish hut of the present day. And it is curious to observe how universal is this ornament, it being found in Etruria and in Central America, whilst even the ceilings of the rock-cut temples of Egypt are carved in imitation of the flat palm-tree roofs of an earlier time.

Take, as another instance, the front of a rock-cut temple in India. You will see that it is simply an imitation in stone of a wooden structure, with its sloping posts and wooden purlins, and the curved bamboo roof, which was the original type of the curved roof so common in India at the present day; whilst the curious ridge ornaments on the latter are simply imitations of the curved timbers placed over the domed roof to keep down the thatch, as we see great stones put on the roofs of the Swiss châlets at the present day to keep the shingles from being blown away, and as we see in the paintings on Etruscan vases of the old Etruscan huts.

All the examples I have just referred to involve the preparation of working drawings previously to their construction. But there are ancient buildings of a simpler kind, which, although built on regular principles, might have been, and probably were, constructed without working drawings, although some system of lines must have been struck out for the purpose of obtaining the templates to which the stones were worked. There is a very interesting example of this in the building known as the Treasury of Atreus at Mycenæ. The building is circular in plan, with a porch approached by a flight of steps leading down to the level of the chamber, and a square inner chamber, of which the use is unknown, the whole plan having a very curious resemblance to that of some of the Bornholm churches, with circular naves and square chancels. The principal chamber is a dome, of which the section is an equilateral arch, of which the radius is equal to the diameter of the chamber at the floor level. You will see that every course of stones had to be cut to a different angle, and the templates were probably obtained by striking out the curves on the ground with a string, and marking on them, as the work proceeded, the heights of the several courses. There is a great deal of interest about this building, which was probably both a tomb and a treasure-house, because by its means we obtain glimpses of the meaning of early myths, which are thus brought into the borderland of true history. It was lined with either brass or bronze plates, which have been removed, leaving, however, in many places the nails by which they were fastened to the walls. This was a common mode of decoration, and we find references in the Odyssey to the "brazen walls" of the palace of Alcinous.

Going back to the early history of Argos, we find that Acrisius, king of Argos, shut up his daughter Danaë in a "subterranean apartment" or "brazen tower" (one author refers to her being deomed to a "sepulchral couch") lest she should give birth to a son who should kill his grandfather. How this precaution proved ineffectual, and the mother and child were subsequently exposed on the sea in a chest, and afterwards landed safely at "Seriphus," has nothing to do with my present subject. I merely wish to point out here that the apparent contradictions in the references to the chamber in which Danaë was confined receive a complete solution in this building, which, from its early date and position at Mycenæ, may very probably have been the actual prison of the unfortunate princess.

Referring, however, to the subsequent history of Danaë and her son Perseus, I may remark that we get a glimpse of serpent or dragon worship in the story of Andromeda, daughter of King Cephus, who was chained to a rock and exposed to a sea monster by her father, in obedience to an oracle, and afterwards rescued by Perseus, who brought her and his mother Danaë with him back to Mycenæ.

It is worthy of remark that the serpent or dragon, which is typical of the religion of the Gauls, was always a water monster, and that it had to be appeased by human victims, and we have on an ancient painted vase a representation of Latona on the seashore at Delos protecting her two children from an immense serpent. So, at the taking of Troy, one of the incidents described by Virgil in his "Eneid" is the killing of Laocoön and his sons by two enormous serpents, which swam out of the sea, and, coiling round them, destroyed them.

Let us go back for a moment to the tombs of Lycia, built as direct copies of an earlier timber construction. Following the progress of Greek art through later stages, we arrive at a period when the ornamentations, although based on timber types, had passed from the phase of direct imitation to a genuine stone style. Thus, although the design of the Classical peripteral temple is evidently based on the simple rectangular stone hut, with a flat roof of round poles, covered with earth, and supported by round posts, which, to the present day, is the ordinary barn of the Turkish peasant, yet we see in the Parthenon that the triglyphs, which may be supposed to represent the ends of the cross-beams, are mere outside ornaments, and are not even carried through to the main wall of the *cella*. In this case we have passed from the "con-

* The following discourse, delivered before the Cathedral Guild of Christchurch, Canterbury, New Zealand, we received, at the request of the writer, through the hands of Mr. G. E. Street, R.A., who thought it agreeable,—and we quite concur with him,—to find men interesting themselves there in such matters. The remarks were illustrated on delivery by a number of large drawings of the several buildings referred to. Those necessary for the comprehension of the text are repeated here on a small scale. Mr. Dobson will be remembered as author of some of the papers in Weale's Series.

structive" to the "æsthetic" principle of design.

I referred just now to a scientific principle of design. I do not here allude to buildings erected for scientific purposes, such as astronomical observatories, which from their purpose demand special constructive arrangements, or to the science displayed in the construction of ordinary buildings, but to buildings which, apart from their apparent use and method of construction, contain scientific secrets, as it were, in their proportions, as completely as the historical tablets built into the walls of the Assyrian palaces or the coins which we drop into the foundation-stone of a public building to inform posterity when it shall have become a ruin of the date of its erection. Such, for instance, appears to have been the case with the great pyramid of Gizeh, which, although apparently intended for a regal tomb, seems also to have been designed as a record of a number of geometrical and astronomical facts which are expressed in the relative proportions of its different parts. So far as I am aware, the later pyramids are simply imitations of their great predecessor, and do not display any signs of the secret knowledge possessed by the builders of the tomb of Cheops.

I am afraid you will think we are a long time in coming to the Bornholm churches, but we are "beginning to burn," as the children say, and although we seem to have gone a long way round, yet we have all the time been gathering facts which will help us to understand the special significance of the little rude structures which form the ultimate object of my remarks.

Last on my list I have placed the "religious" principle of design, and let me at once explain that in using this expression I do not refer in any way to systems of proportion which may have been adopted to render a building fitted for its religious uses, but to a system of symbolic proportions, apart from, and even opposed to, those uses.

On the principle of the old proverb, "Il faut reculer pour mieux sauter," let me make one or two remarks on the leading types of architectural form.

One of the oldest types of which we have any distinct record, is the round hut with a domed roof, formed, not by straight rafters leaning against each other, but by boughs bent round into a curve and interlaced with each other. We see this form perpetuated in the sepulchral vases of the old necropolis buried at an unknown age under the tufas of Mont Albano, near Rome. It is the type of the old British hut, the design of which is clearly traced in the sites of the early British towns of which so many examples still remain. We see it sculptured on Trajan's Column at Rome; we find it alike in the kraal of the Caffir and snow-house of the Esquimaux, in the capital of Abyssinia, and in the dome of St. Sophia. It is scarcely too much to say that we find it copied in stone in the prison of Danaë at Mycenæ, in the Baptistery at Pisa, and in the round churches of which I am presently about to speak.

But with the Classic temple, which, as I have already shown, was based upon the simple type which has been handed down to the present day in Asia Minor, another class of forms grew into use in which rectangular plans and horizontal and vertical lines predominate; and it may be said that whilst in Arabia, India, and Persia, circles, interlacing curves, and serpentine lines are still leading elements of design, modern architectural design in Western Europe is essentially rectangular in character.

With the rise of Roman power arose an attempt to blend the rectangular forms of Grecian architecture with the domed type to which we have just referred; the result of which we see in the early Christian architecture of Italy, and in the round-arched churches of Western Europe. But in all this the "motive" of design is simply constructive; till, somewhere about the end of the tenth century, there sprang up a new feature, viz., the use of the equilateral triangle as a canon of proportion, the result of which was the abandonment of the round, and the introduction of the two-centred pointed arch; and this, as I shall presently show, was based upon a "symbolic" and not a "constructive" principle, which, in many instances, must have remained to the uninitiated as much a secret as the astronomical truths supposed to have been recorded in the proportions of the Great Pyramid.

There is no lack of examples of structures of which the ground-plans are of a symbolic character. The mound-builders of North America constructed huge bas-reliefs of animals, which can only be supposed to have had some religious meaning.

The tracks of the Phœnicians in Western Europe are marked by groups of stone pillars forming circles and serpentine avenues evidently connected with serpent-worship and human sacrifices. As examples I need only remind you of Abury, in Wiltshire, and Carnac, in Brittany, both temples of serpent-worship on a gigantic scale. Quite recently Dr. Phené has discovered in the Pyrennees earthen mounds similar in construction to those of North America, but emblematic of the serpent or dragon, and the churches in the neighbourhood abound in features expressive of the subversion of a pagan faith of which the dragon had been the representative. In some cases the serpent's head is marked by a church, presumably circular, but the published report of Dr. Phené's paper is too brief to give all the details that could be wished for on the subject. As, however, Dr. Phené has undertaken to read a paper on the subject at Brussels before the Pre-historic Association, we shall, no doubt, soon be in possession of a valuable addition to our scanty knowledge of the history of serpent-worship.

Sculpture connected with serpent worship is to be found throughout France and Northern Europe, and up to the present time there is a religious festival held yearly at Tarascon-sur-Rhône, in which a dragon is led captive through the streets by a girl representing St. Martha, in front of a large body of clergy, nuns, and laity, who are preceded by banners representing the virgin treading on the serpent, and St. Martha treading the Tarasque under foot, and delivering from death a child already in its mouth.

All these things point unmistakably to serpent-worship, with its human sacrifices, having been a terrible reality.

I have dwelt somewhat longer than I should otherwise have done on serpent-worship, because I think it very probable that further researches along the route frequented by the Phœnicians between Cornwall and Marseilles may bring to light many peculiarities in the churches of those districts, where we might expect to find that the circle (which, both as an emblem of the sun, and as representing the head of the serpent, was a leading form in what are commonly known as Druidical monuments) had been retained as a constructive form after the worship of which it was an emblem had been superseded by a different faith.

It would be interesting to trace out whether the round churches built by the Knights Templars, who were always suspected of a leaning to paganism, were really designed as Christian churches; or whether they were intended secretly to perpetuate the old pagan beliefs; but at present we do not possess sufficient published data for entering upon such an investigation.

And now, after this somewhat lengthy preface, we shall be able to understand the thoroughly unique character of the Bornholm churches which form the subject of this lecture.

I may remark, for the benefit of those whose geography is a little misty, that Bornholm is a small island in the Baltic Sea, having belonged sometimes to Norway and sometimes to Denmark, but at present under the latter power, and in earlier times was often visited by pirates, on which occasion the inhabitants retreated to their churches. I refer to this, because some of the churches appear to have been loopholed for defence, which has led to a theory of their having been built as forts, and subsequently adapted as churches, an idea which is at once dispelled by an inspection of them.

There are several modern churches which are simply rectangular barns, and offer no subject for remark, except in the primitive construction of the roofs. Whether there is no long timber in the island, out of which to cut the tie-beams, I know not; but the rafters are propped up in the centre by struts resting on rough square piers of masonry, built up in the middle of the naves, and forming what we should consider most inconvenient and unsightly obstructions. This style of roof timbering seems to have been handed down for centuries, without a thought of the possibility of a more scientific mode of construction.

The earlier churches, which I am now going to describe, have all circular naves. In some the chancels are rectangular, in others the chancel walls are curved in plan; but they are all based on a rigid system of proportion, as shown by the diagram before you. And let me remark that the principle of design is not "utilitarian," for it would be difficult to imagine a building more inconvenient, or less adapted for the services of the church, than the church of Oster Lars, of which sketches are before you. It is quite true that there is a font, a pulpit, a communion-table, and rows of seats for the congregation, but very few of the congregation can see the officiating clergyman; hearing must be a matter of considerable difficulty, and the sight of the chancel is obstructed by the tower-like pier in the centre of the nave. The principle of design is not "constructive," for there is no constructive design whatever. The walls are merely built of rough rubble, and the roof is strutted up from the tower-like pier in the centre of the nave with an utter absence of anything like skilled carpentry. The principle of design is not "æsthetic," for there is not the slightest attempt at ornament or any visible system of proportion of parts intended to give pleasure to the eye. Further, this church has not been built from working drawings any more than the unprincipled building in respect of which the contractor remarked that the next time "he would chalk his staircase out on the wall." The work has been simply set out on the ground with a line, and it is doubtful whether the mason even used a square. You will, perhaps, ask, How do we know all this? The answer is very simple. If you will look carefully at the plan of Oster Lars Church, you will see that the reveals of the door openings are not squared to the walls, as would have been the case if the builder had used a square; nor do the doorways come opposite the centre of the nave, as we should have expected, and as we see in other round churches,—for example, in St. George's, at Thessalonica, a circular church with a square chancel, built A.D. 400; but they are centred on a line cutting off a segment of the nave. This fact first gave me the clue to the secret hidden in these extraordinary buildings; but it was some years before the solution of the problem presented itself to my mind.

At the present day, when we want a coloured window for the decoration of a new church, or the repair of an old one, we send an order to a tradesman, who employs a number of artists who work simply on æsthetic principles, and whose treatment of the same subject may differ widely, according to their individual taste and their knowledge of the harmony of colours. But it was not so formerly. Even at the present day at the monastery of Mount Athos, whose monks are employed in illuminating, no such liberty is allowed. Every saint has his traditional attitude; every martyr is attired in traditional colours, from which no variation or deviation is allowed.

It is difficult to find out at what date representations of the Crucifixion began to be employed in the Christian church. (You will bear in mind that the cross is not an exclusively Christian symbol, but was employed in Egypt long before the Christian era.) But when we come across the few representations of the Holy Trinity which escaped the iconoclastic fury of the Puritans, we find that they are based on canons as rigid as those which regulate the decorative talent of the monks of Mount Athos.

Here you have a very interesting specimen from a window in St. John's Church, Micklegate, York (*see illustration*). Examine it carefully and you will see that so far from its having been designed in the picturesque style adopted by our modern glass-painters, it is simply based on a geometrical diagram, by which every part of the design is rigidly fixed. And further, if you will take a pair of compasses and experiment for yourselves, you will find that the initial radius being given, every portion of the design follows in due order.

Now turn back to the plan of Oster Lars Church and you will see that it presents a repetition of this diagram, which has been traced on the ground with a line and a couple of pegs, one as a centre, the other as a tracing point, and that the walls have been built on the lines so traced, without squaring the openings or making any attempt whatever at architectural design.

The leading points given are shown very clearly in the skeleton diagram before you. You will see that this system of intersecting lines defines,—

1. The width and length of the nave.
2. The width and length of the chancel.
3. The position of the three nave windows, which typify the wounds in our Saviour's hands and feet.
4. The position of the entrance-doors, which

are centred on a line passing through the Saviour's loins, to show that through Him we enter into life.

And this at once explains the peculiar position of the doorways and the reason of the reveals not being square to the face of the walls.

It is impossible to look at these plans without the conviction that it was intended in them to illustrate the well-known passage in St. Paul's epistle to the Hebrews, x. 19-22,—"Having therefore, brethren, boldness to enter into the holiest by the blood of Jesus, by a new and living way, which he hath consecrated for us, through the veil, that is to say, his flesh; and having an High Priest over the house of God; let us draw near with a true heart in full assurance of faith, having our hearts sprinkled from an evil conscience, and our bodies washed with pure water."

I have taken Oster Lars Church for illustration, because its plan is more complicated than that of the churches with square chancels, but the principle of design is the same in all. It is difficult with the few data I possess, to fix any precise date to the Bornholm churches, but I am inclined to assign them to the early part of the eleventh century.

Many years ago I was called in to advise as to the improvement of a little church at Chaldon, in Surrey, and completed the tower and spire which had been begun in the time of Elizabeth, and left unfinished either for want of funds, or want of agreement among the parochial authorities. It is an innocent-looking church, apparently twelfth-century work, with the original roof and inserted windows of later dates. (I made a complete set of drawings of the building which are not now in my possession.) Some years afterwards, when testing the proportions of the Bornholm churches, it occurred to me to strike out their lines on the plan of Chaldon Church, and, to my surprise and delight, I found that this plain, innocent-looking building was planned on identically the same system. Of this you can satisfy yourselves at a glance by examining the ground-plan of Chaldon Church, which is before you.

But further, on examining the section of the building, I found that it was also a repetition of the ground-plan diagram, the main roof being an equilateral triangle.

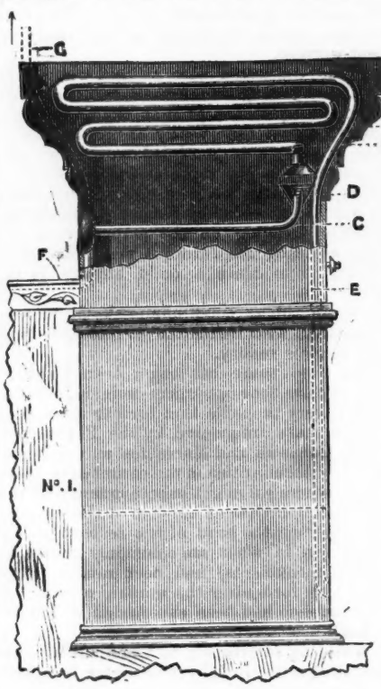
I have no doubt that an examination of the ground-plans of churches built about the eleventh and twelfth centuries would reveal that this system of lines, intended to symbolise a summary of Christian faith, was most extensively used. The fact appears to be proved by the examples I have just brought forward, which could not have had the slightest connexion with each other. How long this system of lines retained its original meaning, it is impossible to say, but from the date of the introduction of the equilateral arch, it will be found that the canon of proportion between breadth and length not only in churches and cathedrals, but in most buildings of any architectural design, is simply based on the relation between the base of an equilateral triangle and the perpendicular dropped on it from the opposite angle. Of this you may satisfy yourselves by inspection of the plans of the English cathedrals with a pair of compasses, and although, no doubt, this canon of proportion soon became a constructive axiom quite apart from its original symbolic meaning, it appears to me that its use in the first instance in Western Europe was entirely symbolic, and peculiarly and essentially Christian.

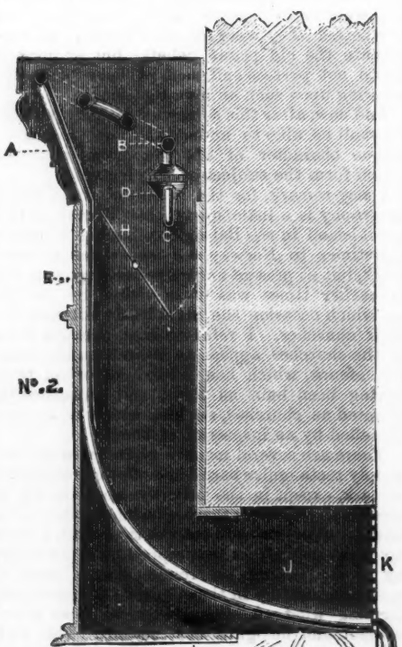
At a later date we find the essential proportions of the Bornholm churches repeated without a trace of symbolism. Take, for instance, the Church of San Thomaso in Limine, near Bergamo. The relative proportions of the nave and chancel are based on the double equilateral triangle. The circular wall in the centre of the nave of the Bornholm Church has developed into a circle of columns, and the whole building, both internally and externally, is highly decorative in character. But whilst the motive of the Bornholm church is simply and purely symbolic, that of the Italian church is at once "utilitarian," "constructive," and "æsthetic," and the symbolism has entirely dropped out. This is seen at once by the altered position of the doorways and the absence of the three windows marking the extremities of the cross.

And with this speculation I must close my remarks, trusting that the time devoted to the consideration of this hitherto curious chapter in the history of Christian art has not been unprofitably spent, and that the dissemination of the facts which I have brought before you may lead to further investigations, and to the determination of the question whether this system of symbolism was generally understood and acknowledged, or whether it was a secret confined to particular localities, or to special branches of the early Christian Church.

METHOD OF WARMING FRESH AIR.

Messrs. Robert Boyle & Son, ventilating engineers, of 64, Holborn Viaduct, are the inventors of a simple arrangement for warming the supply of fresh air admitted into rooms and public buildings. It consists of a miniature coil of pipe placed on the top part of a vertical tube as shown in diagram No. 1. A is the top of the tube, made of iron or zinc to render it fireproof, B the coil, C an air-burner, D shield perforated at the bottom to prevent the current of air passing up the tube affecting the flame; E, pipe to carry off the products of combustion; F, ¾ gas-pipe led from the most convenient source





to supply the air-burner; G shows gas-pipe brought down from a bracket. Diagram No. 2, H, regulating-valve in tube; J, air-hole through the wall; K, cast-iron grating; L, mouth of the pipe for carrying off the products of combustion. Dimensions of the air-shaft are 20 in. by 9 in. by 4½ in.

This plan has the advantage of being economical, and, with it, in conjunction with the air-pump ventilator, Messrs. Boyle say they will guarantee the satisfactory ventilation of any building without the slightest disagreeable draught being experienced.

MACHINERY AND APPLIANCES AT THE SMITHFIELD CLUB SHOW.

In connexion with the eighty-fourth annual Cattle Show of the Smithfield Club (which closes this Friday, the 9th inst.) a good collection of machinery and appliances has been brought together in and under the spacious galleries of the Agricultural Hall. The hall is very effectively lighted at night and during the dark hours of the day by the electric light, a large number of arc lights, on the Brush system, being suspended from the roof. The comfort and even the safety of visitors have been insured by the laying down of a new floor over the area of the hall, in lieu of the dangerously-rutted and dilapidated one of which visitors to the hall, in connexion with various exhibitions held there during the last two or three years, have had so much reason to complain. Stands 1 to 32, include the heavier exhibits, which are placed under the galleries, while Stands 33 to 221 are in the galleries.

At Stand 1, Messrs. Robey & Co., of Lincoln, show traction-engines, and some very good portable engines and boilers combined. Their patent "Robey" engine is of the horizontal type, and is placed beneath a horizontal boiler. Messrs. Wallis & Steevens, of Basingstoke (Stand 2), are exhibitors of portable steam-engines and agricultural machinery. Stand 3 is occupied by Messrs. Richard Garrett & Sons, of Leiston, who show portable steam-engines of good and simple construction, one of them fitted with Graham's "spark-arrester." This firm also exhibit a good horizontal double-cylinder engine. Messrs. R. Hornsby & Son, of Grantham (Stand 4), show a handy vertical engine and boiler combined, and an 8-horse power portable steam-engine, suitable for farmers, contractors, or builders. They also exhibit a horizontal engine of simple design and good workmanship, and a new patent narrow-gauge traction-engine. At Stand 5, Messrs. Barrows & Stewart, of Banbury, display a compact portable 3-horse power vertical engine and boiler, and a larger portable engine with horizontal boiler. Messrs. Hempsted & Co., of Grantham (Stand 7), show some compact vertical engines in conjunction with welded boilers. Stand 9 is occupied by the well-known firm of Clayton & Shuttleworth, Lincoln, who show a 6-horse power fixed horizontal engine, very compact and excellently finished, together with portable steam-engines for traction and other purposes. At Stand 13 Messrs. W. Allchin & Sons, of Northampton, have some good vertical and horizontal steam-engines on view. Messrs. J. & F. Howard, of Bedford, exhibit (Stand 16) "The Farmer's Engine," suitable for traction, steam-ploughing, and other purposes. Messrs. Aveling & Porter, of Rochester (Stand 17), show a ploughing-engine capable of use as an agricultural locomotive or traction-engine, and a convenient wagon for use with road locomotive, side-tipping, and capable of carrying 8 tons. At Stand 19, Messrs. W. & S. Eddington & Co., of Chelmsford and Queen Victoria-street, are exhibitors of portable engines of simple and good construction. Stand 22 is allotted to Messrs. E. R. & F. Turner, of Ipswich, who exhibit several of their specialities, among the foremost of which is their 8-h.-p. portable steam-engine, fitted with the Hartnell automatic expansion gear. It is now, we believe, some ten years since this engine was first introduced, and it has given proof of its title to hold a position in the very first rank of engines of its class. They also show a smaller-sized portable engine, 4-h.-p., of ordinary construction, very light and handy, yet strongly built. Their "Gippeswyk" engine is represented in two of its various forms, viz., as a horizontal fixed engine, and vertical with boiler combined, mounted upon four travelling wheels. The design of these engines is good, and the construction and finish leave nothing to be desired. Another of Messrs. Turner's leading specialities is corn-grinding mills, several of which are shown. At Stand 23, the Agricultural and General Machinery Company show Darby's broadside steam digger, which has been considerably improved since we saw it at the Kilburn Agricultural Show. Messrs. Ruston, Proctor, & Co., of Lincoln, show, at Stand 25,

some horizontal and portable engines of excellent design and workmanship. Messrs. Marshall, Sons, & Co. (Limited), Gainsborough, show, at Stand 27, some good horizontal and vertical engines. Stand 32 is occupied by Messrs. W. Crosskill & Sons, of Beverley, whose carts and wagons for agricultural and builders' purposes are well known.

Of the large number of exhibits in the galleries we can only notice a few. At Stand 37 Messrs. Piggott Brothers, of Bishopsgate-street, are among many exhibitors of tarpaulins, ropes, and other requisites for builders no less than for agriculturists. At Stand 59 Messrs. Lane & Reynolds are exhibitors of horizontal steam engines. At Stand 75, the Jeyes Sanitary Compounds Company exhibit their products as applied to domestic and agricultural purposes. One of their products is also devised for the preservation of wood, especially with a view to prevent the ravages of white ants in India and other countries. Stand 77 is occupied by Messrs. Croggon & Co., with galvanised iron and other tanks, wire netting, &c. Messrs. Reynolds & Co. (Stand 89) are also exhibitors of galvanised netting for sheep and game. Mr. John Bellamy, of Millwall (Stand 93), exhibits a variety of galvanised iron and other tanks, corn-bins, feeding-troughs, &c. Churns and other appliances for the dairy are shown at Stand 97 by Messrs. Thomas Bradford & Co. The St. Pancras Ironworks Company (Stand 99), have some excellent stable, cow-house, and piggery fittings on view. Messrs. G. W. Murray & Co., of Banff (Stand 105), show, amongst other things, wire-straining brackets for fencing, and chain-pumps. Messrs. Francis Morton & Co. (Limited), Liverpool, are exhibitors (Stand 111) of models of corrugated iron buildings for agricultural purposes, such as hay-barns, cattle-sheds, and covers for corn-ricks. Messrs. R. P. Taylor & Co., of London Bridge, are exhibitors of chaff-cutters, grindstones, and other useful appliances. At Stand 119, Mr. W. A. Gibbs, of Chingford, exhibits working models of his harvest-saving machinery, in the form of hay and corn dryers, to which we have on more than one occasion during the last two or three years called special attention. By the use of these or similar appliances a vast quantity of food for man and beast which has been lost owing to bad weather in recent years might have been saved. We note that a company is in course of formation for the purpose of making and selling Mr. Gibbs's valuable inventions. Messrs. Bayliss, Jones, & Bayliss, of Wolverhampton (Stand 122), are exhibitors of iron hurdles and fencing. Messrs. Hayes & Son, Stamford, show (Stand 125) some well-constructed carts for agricultural and other use. Messrs. Barford & Perkins, of Peterborough (Stand 133), are exhibitors of steam cultivating tackle, food-cooking apparatus for the stock-yard, grinding and grist mills, oil-cake crushers, &c. Stand 137 contains some well-made carts and wagons, exhibited by Messrs. W. Glover & Sons, of Warwick. Mr. E. S. Hindley, of Bourton, Dorset (Stand 138), has a large show of vertical engines and boilers, portable and of good construction; also a strongly-built horizontal engine. At Stand 165, Messrs. Hill & Smith, of Brierley Hill, show iron hurdles and fencing, including a new and ingenious sheep-folding hurdle and trough combined. At Stand 167, Messrs. Barnard & Lake, of Braintree, show a thatch-making machine, Messrs. Charles Powis & Co., of Gracechurch-street and Millwall (Stand 214), show horizontal and vertical engines of simple design and good construction.

Among the exhibitors in the Arcade entrance, are Messrs. Burney & Co., of Millwall, who exhibit iron tanks; Messrs. Crossley Brothers & Co., with their well-known "Otto" gas-engine; Messrs. T. Bradford & Co., of High Holborn, who show laundry machinery; Messrs. Rosher & Co., who show stable bricks, garden tiles, vases, &c.; Messrs. Hamilton & Co., who show pavement lights; and Lord de Blaquière, who shows his patent "detachable runners" for at once converting carriages into sleighs without taking off the wheels, and which seem to be well calculated to answer their purpose. The exhibits most interesting to builders in this arcade will be those of Messrs. Lewis & Lewis, of Laurence Pountney-lane; Messrs. F. W. Reynolds & Co., of Southwark; and Messrs. Henry Wurr & Co., of Blomfield-street. Messrs. Lewis & Lewis exhibit a saw-bench and band-saw machine, both of which possess some good points. Messrs. F. W. Reynolds & Co. show some of the most useful of their specialities in the way of mortising and other wood-working machines, including their handy little contrivance for fitting a mortise-lock to a door after the latter is on its hinges. A new portable hoist for builders, which can be fixed in a minute or two by clamping it on to a scaffold-standard, is a very handy contrivance, and should be looked at. Messrs. Henry Wurr & Co.'s exhibits include a new circular saw-bench with fixed spindle and rising and falling table; this is likely to be very much appreciated. They also show a new band-saw machine with the column and bed-plate cast in one; and the "Ord" patent silent gas-engine, a new aspirant for favour as a means of utilising gas as a motor.

The only exhibit which we need notice in the bazaar known as "St. Mary's Hall" is that of Messrs. Charles Powis & Co., who show some very good saw-benches.

EDINBURGH ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of this association was held on the 30th ult. A paper was read by Mr. James Gordon, entitled "Architectural Notes in Normandy," giving some account of a sketching tour recently made by the author and two other members of the association in that part of France. Taking the order in which the towns on the line of route were visited, Mr. Gordon proceeded to describe the attractions which each presented to the architectural student, and the peculiarities of general design and detail of the various buildings. Rouen and Caen with their environs, Coutance and Mont St. Michel, came in for a larger share of notice, as being especially rich in objects of interest. Many other places visited were also described. Normandy, he thought, was, with perhaps the exception of the district round about Paris (the old "*domaine royale*"), the best field in which to study the beginnings and development of Gothic architecture, the wealth of examples affording abundant opportunities for comparison between the various periods. But, Mr. Gordon said, while the field in Normandy thus offered to the student quite an *embarras de richesses* most convenient for systematic study, it was not to be understood that the study of such monuments or such remnants of them as remained to us at home should be neglected. On the contrary, these were deserving of, and should first receive, the most careful study, for, although unfortunately for the most part only fragmentary, they were in no way inferior to the French examples. Few, if any, of the latter could be compared, as regards chaste refinement of detail, with what is left to us of the abbeys of Dryburgh or Dundrennan, not to mention others. The paper was illustrated by a number of sketches.

ARCHITECTS IN IRELAND.

LAMENTATIONS reach us from Dublin that there is little cohesion among the architects there, that the Irish Institute does little, and that the young men especially want some such organisation as the English Architectural Association. The *Irish Builder* writing on the subject says,—"Of course there are in London several circumstances favourable to the quicker growth of any professional organisation than there exist here; but if we lack a great area and population, and possess but a tithe of the wealth of the great metropolis across the Channel, yet no valid reason exists why we should not have a representation in architecture proportionate to the circumstances of the Irish capital. There are other considerations which ought to influence the architectural profession as well as other professions in this island. There is no doubt but the working of the Land Act will effect in a few short years a great change for the better in this country. There will be less emigration, population will increase faster, and native industries will receive an impetus, and be more widely distributed. This change, besides other improvements, spells building, and building cannot be rife without benefiting the architectural profession. It is the bounden duty of our architects to gather themselves together for the sake of their individual and collective interests, even if they lack a practical patriotic spirit, which we hope they do not. By a true representation they will not only help their own profession, but the interests of their country, social and industrial. Let the work of re-organisation commence with the new year, and let 1882 be signalised by a general awakening over the country."

There is good sense in this appeal, and we hope it will be listened to and acted on. Ireland needs the individual effort of every one of her right-thinking sons and daughters.

BREWERIES.

AT a meeting of the Society of Engineers, held on Monday evening, December 5th, in the Society's hall, Victoria-street, Westminster, Mr. Charles Horsley, president, in the chair, a paper was read by Mr. W. Barns Kinsey, "On Arrangement, Construction, and Machinery of Breweries." The author first stated the general principles which should govern the arrangement of the buildings and machinery; he then treated the subject of Wells and Water. A simple way of preventing contamination was to bore from the surface of the ground, lining the boring with cast-iron pipes, and suspending the pump within the boring, wells of considerable depth having been constructed in this manner. He next described the machinery used in brewing, which he divided into six sections,—namely, pumping, grinding, mashing, boiling, cooling, and fermenting and cleansing, stating that the simplest arrangement was by gravitation, the cold water or "liquor" being pumped to the top of the building into a vessel called a cold-liquor back, thence it flowed to the hot-liquor back to be heated, thence to the mash-tun to be mashed with the malt, from which the wort was run off through a perforated false bottom to the copper to be boiled with the hops, which were afterwards strained from it in the hop-back, and run on to the coolers and refrigerator to be cooled to the required temperature for fermentation. This, the most important process, was carried out in fermenting tuns, and the beer was either skimmed or cleansed. The use of attemperators, cleansing and union casks, together with yeast-presses, elevators and lifts, cask-washing apparatus, &c., were duly described and illustrated by models and diagrams. Lastly, the engines and boilers should be of ample power and of the simplest construction, the Lancashire double-flued boiler being most suitable for brewery work.

HILLCOTTE, SOUTH HAMPSTEAD.

THE new building estate at South Hampstead is rapidly being covered by houses of various descriptions, mostly erected from the designs of architects, and our illustration shows one of the smaller villa residences now being erected in a new road, called Netherall-terrace, running from Finchley-road (nearly opposite the Metropolitan Station of that name) to Hampstead. The walls are faced with red bricks, the upper portion being covered with vertical red plain tiling, and the roofs with Broseley tiles. Messrs. H. Saxon Snell & Son are the architects, and the cost will not exceed 2,000*l*.

EARLY ITALIAN PULPITS: PISTOIA.

THAT the construction and adornment of pulpits occupied considerably the sculptors of the thirteenth century is apparent in those found in Pistoia, Florence, and Pisa, and, in fact, throughout all Italy. The town of Pistoia is so seldom visited by strangers that its many intrinsically interesting works are comparatively unknown. Beginning with the most beautiful though the latest in date of those we have illustrated,—that is, one in the church of San Andrea,—and the one most celebrated in the history of art, the eye will be struck with the elegance and beauty of its form and work. The pulpit is hexagonal in form, sculptured by Giovanni Pisano. It resembles much that of the baptistery of Pisa, but the work is more delicate. Out of the great regard that the Pistoiese had for Niccola Pisano they confided the construction of their pulpit to his son Giovanni, who excelled his father in the delicacy of his work. The pulpit stands about 12 ft. high, and is about 21 ft. in circumference. It is supported on seven columns (in allusion to the mystical biblical number) of thin red marble from the Pisan mountains; four of these seem to have scarcely any support; three have their base, one on the shoulders of a man, a fifth on the back of a crouching lioness, the sixth on a lion with a horse under him; that in the centre is on a base flanked by two eagles and supported by a lion, all Scriptural allegorical figures. The Nativity of Jesus Christ, the Adoration of the Magi, the Massacre of the Innocents, Crucifixion, and Final

Judgment are the five stories sculptured on the pulpit, with endless variety of expression and design. Above 148 figures can be counted carved in relief, besides the beautifully worked angles, the figures in which are about 1 ft. 6 in. in length. The execution of this work occupied about four years, between 1298 and 1301.

Pulpit in S. Michele at Groppoli.

To the famous pulpits of Pistoia, already mentioned, may be added one even anterior. Groppoli is three miles west of Pistoia. Crowe and Cavalcaselle write:—"One of the completest monuments of the twelfth century is the quadrangular pulpit of S. Michele at Groppoli, the faces of which represent, in low reliefs of soft stone, incidents from the New Testament." (The visitation, the nativity and flight into Egypt. A serpent at one of the angles supports the desk. The pulpit rests on columns, whose capitals are filled with heads of animals and monsters, and whose bases rest on the backs of lions. Of the latter, one paws a man, the other a dragon.) "A mutilated inscription may still be read, as follows:—'Hoc opus fecit fieri hoc opus [*sic*] Guiscardus . . . . pleb . . . . anno dñi Mil CLXXXXIIII.'"

Defective as those of Gruamons at San Andrea, in Pistoia, the figures of Groppoli are cut into the flat without any sort of rounding. The incidents are in the old traditional forms, but represented by one living in the infancy of art. The figures, like slender dolls, have draperies marked by rectangular or circular incisions. The flat square heads form but one plane with the neck; the limbs hang, as it were, by threads, together, the features being merely scratched on the surface.

About the close of the twelfth century, Buonamico seems to have been extensively employed at Pisa. Bas-reliefs, that may be assigned to him, on the curved cornice or frieze of the east gate of the baptistery, represent the Redeemer, the Virgin, and St. John, with apostles and angels. The same flat surface, the same forms, indicated by incisions, may be noted here as at Groppoli; and perfect identity of style with that of a tomb in the Campo Santo reveals the artist whose name is inscribed there:—"Opus quod videtis Bonusamicus fecit. P. eo orate."

We have enlarged on the Groppoli pulpit by quotations from Crowe and Cavalcaselle because this pulpit is a sort of starting-point in pulpit sculpture. There is one that is much earlier in Florence, of which a print has been made for Richa's work on churches. As to the inscription on the Groppoli pulpit, it is really dated 1193. Crowe and Cavalcaselle have made it 1194. The inscription reads thus:—"Hoc opus fecit fieri hoc opus [*sic*] Guiscardus.* Pleb. anno dñi, MI⁋ CL✪XXXXIII.†

Pulpit in the Church of San Bartolomeo.

The pulpit found in this church is by Guido da Como, who finished it in 1250, as is attested by an inscription carved on it. Prof. Ciampi thinks that Guido left it unfinished, and that two of the pictures, much inferior to the others, were by one called Turisiano. It is of white marble, carved with eight stories in bas relief,—six of which are in front, two on either side. It stands on three columns,—the first, on the left side, stands on a lion, having between his claws a basilisk, which he in vain attempts to crush; that on the right, on a lioness suckling her young; that in the centre rests on a man carved in white Seravazza marble.

By way of antiquity, after the pulpit of Groppoli, this ranks second among the Pistoian pulpits worthy of observation in the history of art.

Pulpit in the Church of San Giovanni, Pistoia.

This beautiful pulpit, of white marble, is found in the Church of St. John the Evangelist [*fuorci vita*] without the Walls. The name of the maker of it was disputed for some time; Vasari pronouncing it to be from the hands of a German artist, Professor Ciampi from those of a Lombard, and Morrona the work of Giovanni Pisano. Certain it is that the work is of the school of Niccolo Pisano, and it is now decided without doubt to be that of Fra Guglielmo, of Pisa, a Dominican monk, and pupil and fellow-worker with Niccolo Pisano. The pulpit is three-sided; and on the east side the picture has been cut to form an entrance into the pulpit. Ten different sacred stories are sculptured on the pulpit, with six apostles at the division of the compartments. In the front is the angel of the Apocalypse, under which was a face enamelled in gold, covered with a crystal. The pulpit stands on two columns, and is also supported by two brackets that come out from the wall behind. The figures are sculptured with exquisite art and tenderness, especially when the crowded grouping of the figures is considered. There is great resemblance to the Pisan baptistery pulpit. It was executed in 1270, restored in 1398 by Francesco da Siena, and in 1837 by Professor Stefano Ricci.

We shall give some particulars of Pistoia in an early number.

* The "Guiscardus" is omittted in Ciampi's account of the pulpit.

† The MI⁋, for "Mille," is often found thus on old inscriptions.

GENERAL POST OFFICE, BERLIN.

A separation of the Prussian Post Office from the German General Post Office having become necessary, in consequence of the momentous events which transformed Germany from a geographical expression into a political reality, it was soon found that a separate home was required for the new administrative branch of the German empire. The building of the General Post Office in the Leipziger Strasse, Berlin, which we illustrate in our present number, was completed a few years ago. It contains all the necessary offices of such an important department of the public service, besides library, postal museum, and official residences. The number of rooms for a staff of 170 officials is 136; the residences include twenty-seven rooms. The chief architect was Baurath Schwatlo, who was assisted by the sculptor Jungermann.

The General Post Office has its principal front in the Leipziger Strasse, and is a happy deviation from the old Prussian official rule of having official buildings as plain and barrack-like, and as ugly, as possible; a tendency which, we are glad to note, is rapidly disappearing in the new era of the resuscitated German empire. The edifice covers an area of 32,300 square feet, and has a depth, from the street front to that towards the garden, of 320 ft. It consists of a front building and two similar ranges behind at equal distances from each other, all three being joined together by wings, and thus forming two inner courts. The gardens at the back towards the Zimmerstrasse afford ample space for further extensions of the Post-office buildings, should they become desirable in course of time. The façade is in the style of Roman Renaissance. On a granite base, 18 ft. high, including the basement sinking 5 ft. below the pavement, rises the main building in three stories to a height of 67 ft. (with the attic story, 78 ft.), by a width of 117 ft. In the centre of this façade, between the two projectures jutting out 4 ft. beyond the line of the building, a broad vestibule is formed by the entrance-wall being placed back. The superincumbent weight of the upper stories is supported here by two powerful columns, monoliths of blackish-green syenite with sandstone capitals, and similar to those of the Tower of the Winds at Athens, upon which rests the entablature of grey sandstone.

The ground-story, 19 ft. high, has a somewhat heavy appearance on account of its severe simplicity. The windows are slightly pyramidal, the sides inclining towards each other at the top. The side walls of the vestibule are adorned with medallion reliefs of the Great Elector and Emperor William, the founders, respectively, of the Prussian and German post-offices, and the spandrels at both sides of the round-arched portal with high reliefs of two female figures, one in the act of reading, the other of writing. The first story, 16 ft. high, is of the Ionic order, elegantly treated; the windows in the projectures are flanked by Ionic columns in sandstone. There are nine windows altogether in this story, as well as in the upper story, which is also 16 ft. high. The columns, capitals, and window-piers of the latter are of the Corinthian order, with round-arched windows. The spandrels between them and the columns flanking the windows in the projectures are filled by allegorical figures of boys in relief, representing the field, money-order, letter, and parcel post. The pediments of the windows, adorned by lions' heads of the Farnese Palace pattern, are surmounted by an attic, the corners of the projectures of which are surmounted by four figures in sandstone, Mercury and a woman carrying a child on the left, and Neptune and a figure representing Science on the right. The material of the façade is sandstone from Segeberg and Nebra, of a warm reddish hue in various and fine shadings from yellow to flesh colour. The effect is pleasant, and harmonises well with the surroundings.

The vestibule opens on to a high vaulted lobby, running in a straight line to the portal giving on to the first court. Above it the two wings of the main staircase of black grey-spotted marble with gilded railings join into one flight of stairs. The corridors in all the stories are vaulted; the floors are all laid with Mettlach tiles. In the story above, fronting the street, the council-hall, 31 ft. long, 23 ft. wide, and 22 ft. high, is located. It is richly and appropriately adorned. Along its walls and in its niches are placed the busts of the Great Elector, Frederick the Great, Emperor William, and the Crown Prince of Germany, as well as those of men connected with the development of the German postal service, such as Franz von Taxis, Lamoral von Taxis, von Selgeburth, von Hardenberg, Nagler, Schmückert, von der Heydt, Bismarck. There are likewise inserted two tablets containing the names of 156 German post officials who fell in the Franco-German War. A frieze, painted by Professor Schütze, runs round the room, and contains historical compositions symbolising the whole development of written and postal intercourse from the oldest times to the present.

The architecture of the court buildings and their interior adornment are of much simpler and plainer nature than those of the façade; but their arrangements show that much has been done to ensure the comfort of the officials and of the families residing in the building. None of the rooms are less than 14 ft. high, and they are described as well lighted and ventilated. All the stories are provided with lavatories and closets, and water and gas are, of course, laid on throughout the building. The warming and ventilating apparatus (Hentschel's system) was supplied by the Neptune Company. There are in each room two ventilators, one for summer, the other for winter use, all the ventilating conduits opening into a shaft, which receives at the same time the chimney of the boiler. The gas-fittings for 1,200 lights were supplied and laid on by Messrs. Schäffer & Hauschner, of Berlin. The water-fittings were by Messrs. J. & A. Aird, of Berlin. An atmospheric telegraph (by Töpper & Schädel) connects all the rooms with the central offices by pipes, the total length of which is 20,664 ft. An underground cable connects the General Post Office with the Central Telegraph Office in the Französische Strasse.

The total cost, including the price of 34,050*l.* paid for the site, was 148,800*l.*

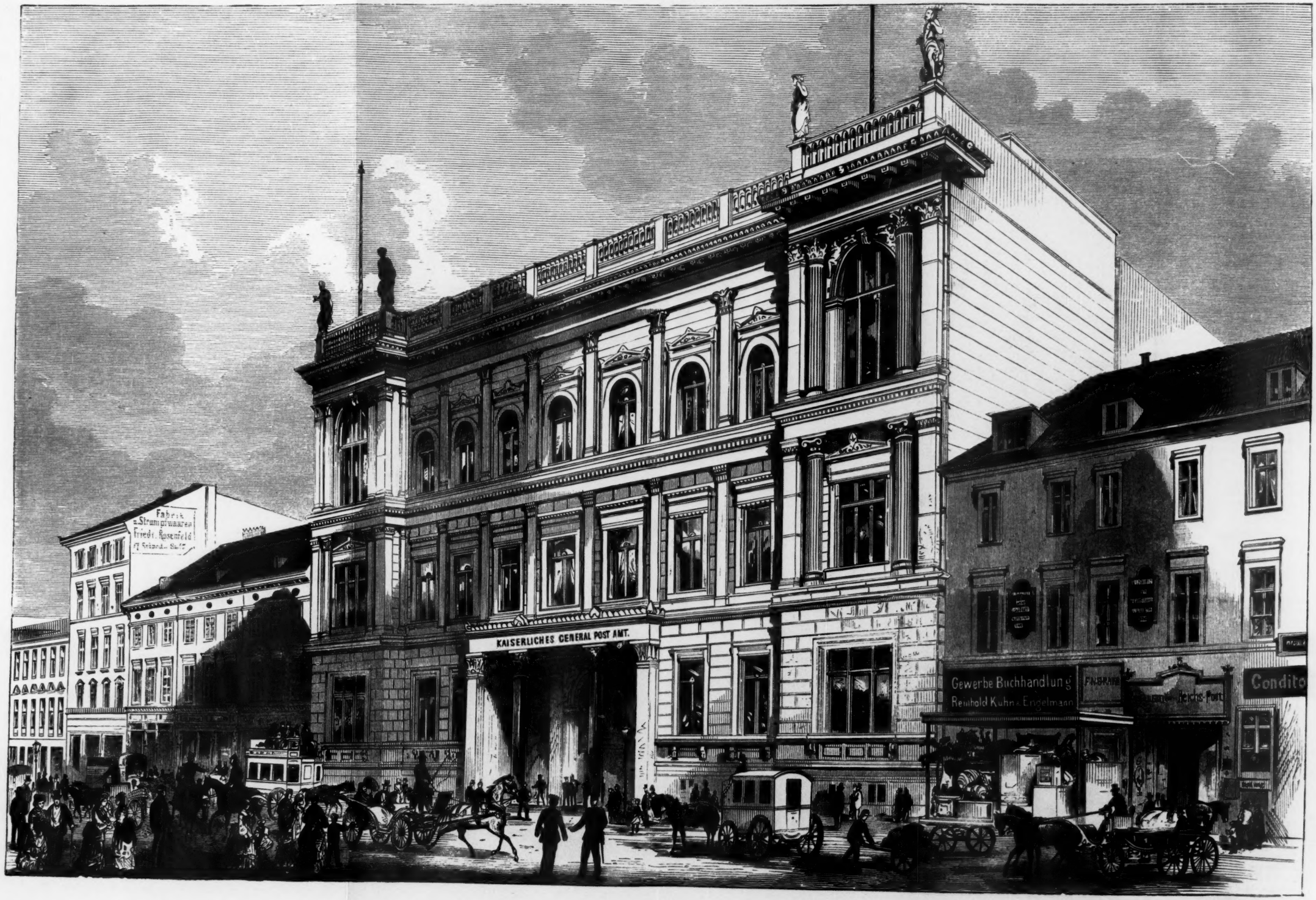
CORNER BUILDINGS AND THE LINE OF FRONT.

Sec. 75 Metropolitan Local Management Amendment Act, 1862, as applied to Corner Buildings.

This being a matter of great importance to our readers, we feel called on to say a few words on the subject. It has hitherto been customary to erect corner buildings according to the general line of frontage in one street, namely, the principal street in which such buildings are situate, and to carry the flanks of such buildings to the pathways in the side streets; and this would appear to us to be the correct reading of the Act, for, if a purchaser of a corner plot were to be expected to adhere to the general building lines in each street, his plot of ground might be useless altogether. Some person out of mere spite might erect a row of houses at the rear of such corner plot with a general building line (say, for argument) 20 ft. from the pathway, which might be the total width of the corner plot, and in such a case the whole of such corner plot would be lost to the purchaser.

There also appears to us another reason why this section should be construed in the manner we have suggested. The words of the section are "beyond the general line of buildings in any street, place, or row of houses in which the same is situate." If two general lines of buildings were intended, the words would surely have been "*street or streets, road or roads,*" &c., and the Legislature would have made some provision for compensation in such cases, otherwise great hardship would be inflicted without a remedy.

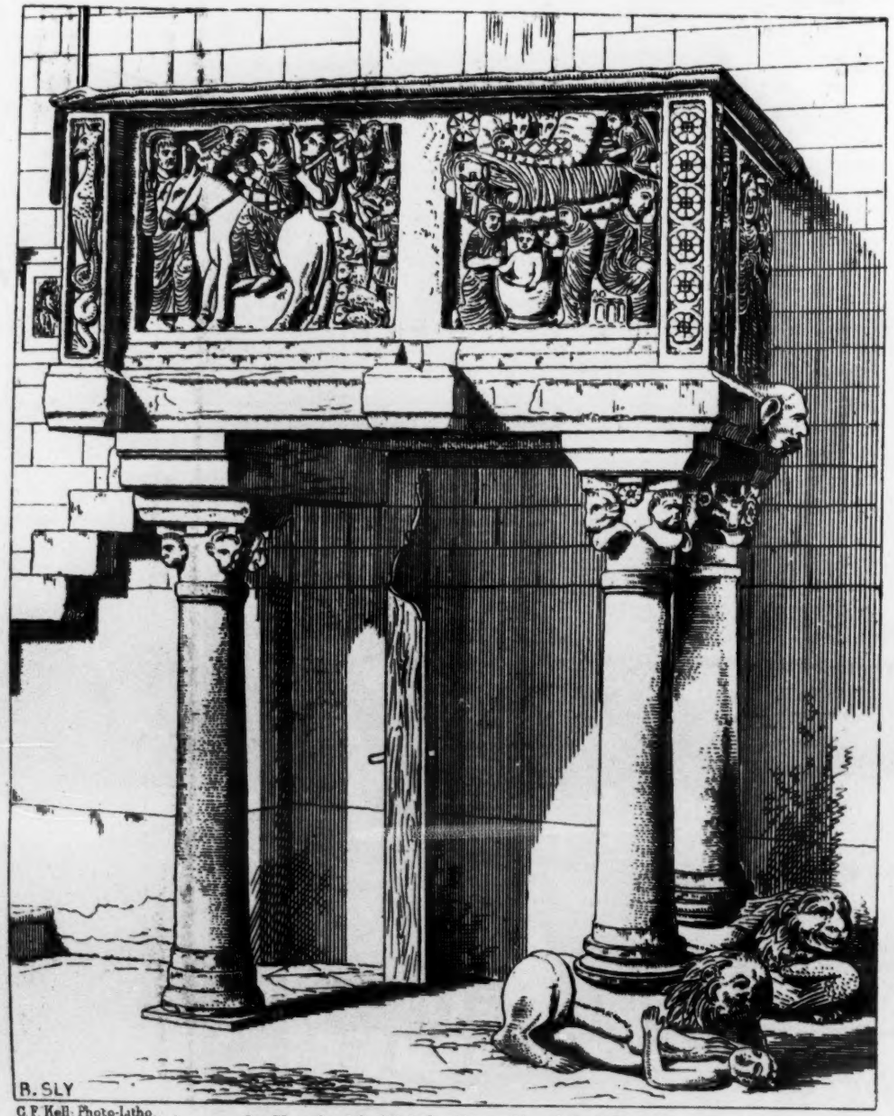
Civil and Mechanical Engineers' Society. The opening meeting of this Society was held on the 8th inst., and the president, Mr. A. T. Walmisley, Assoc. Mem. Inst. C.E., delivered an address.



THE GERMAN GENERAL POST OFFICE, BERLIN.—BAURATH SCHWATLO, ARCHITECT.

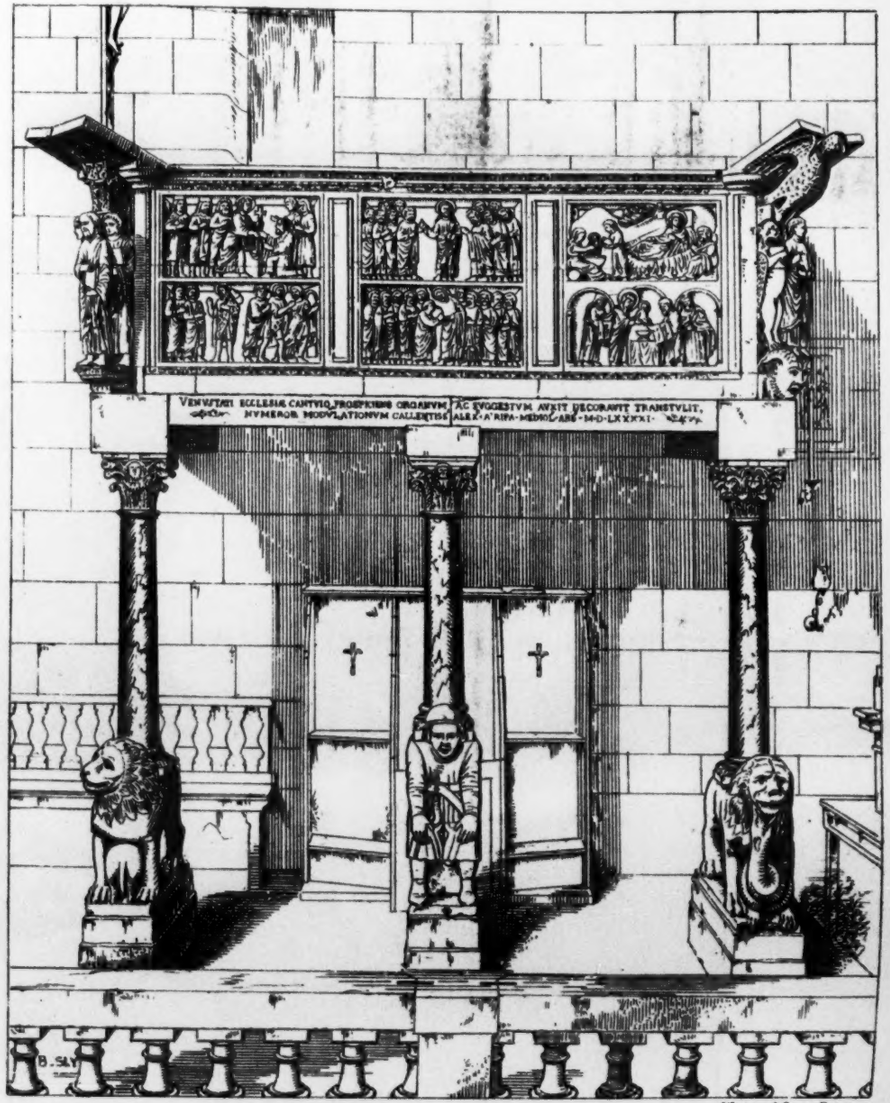
Whiteman & Bass, Photo-Litho 236, High Holborn.

Wyman & Sons, Printers, 74 Queen St.



C.F. Kell: Photo-Litho.

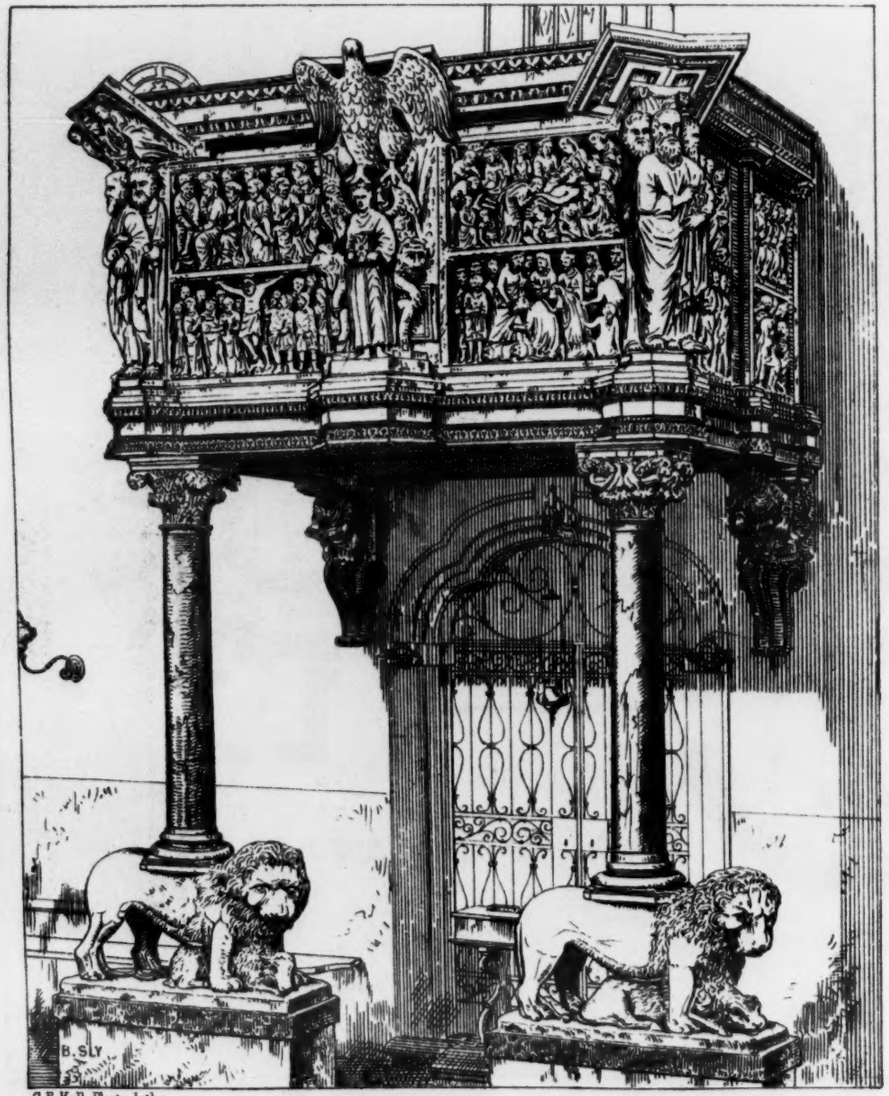
In Church of S. Michele, Groppoli. A.D. 1193.



In Church of S. Bartolomeo, Pistoia. A.D. 1250.

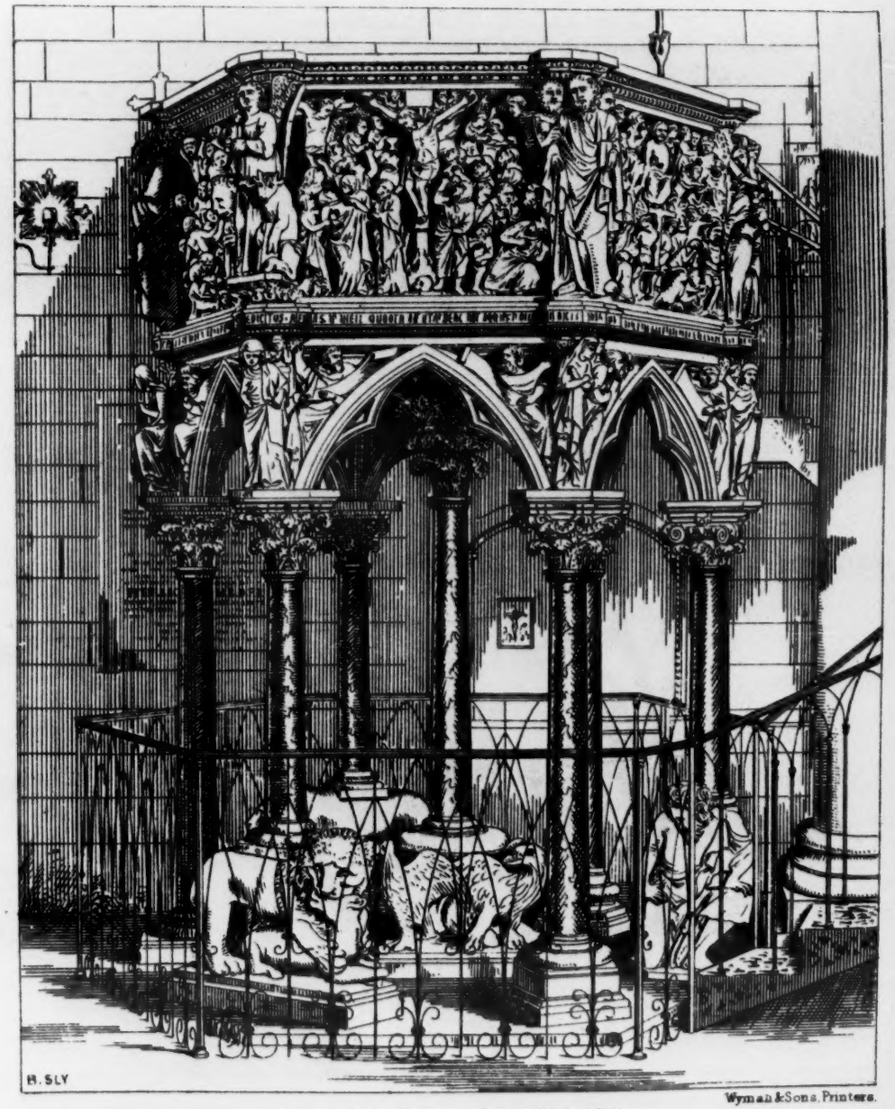
Wyman & Sons, Printers.

EARLY ITALIAN PULPITS.



C.F. Kell. Photo-Litho

In Church of S. Giovanni, Pistoia. A.D. 1270.



Wyman & Sons. Printers.

In S. Andrea, Pistoia. A.D. 1298 *to* 1301.

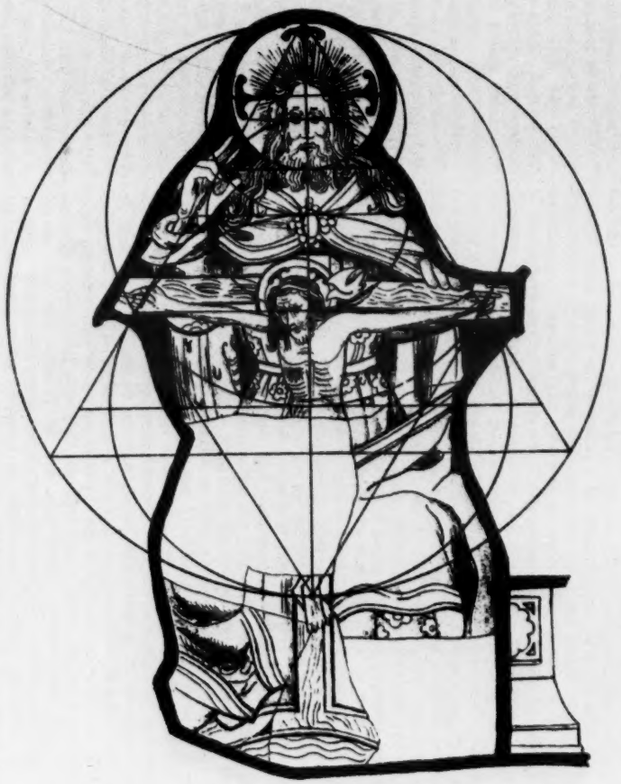
EARLY ITALIAN PULPITS.

— Emblem of the Trinity —

From Stained Glass at St Johns Church Micklegate York 14th century

traced from Weale's Papers on Architecture Vol. I.

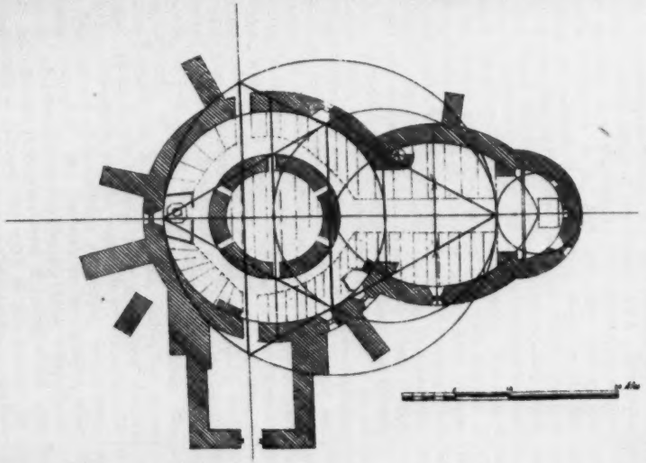
NB: The construction lines added by E. Dobson



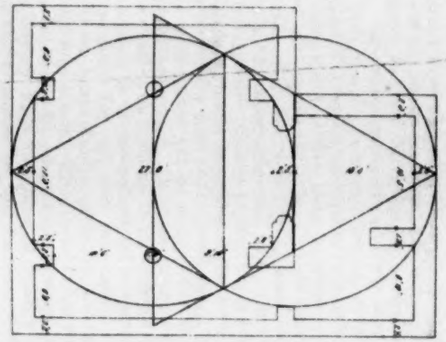
NB: This plan is copied from a plate in a folio history of Bornholm published at Copenhagen

The construction lines added by E Dobson

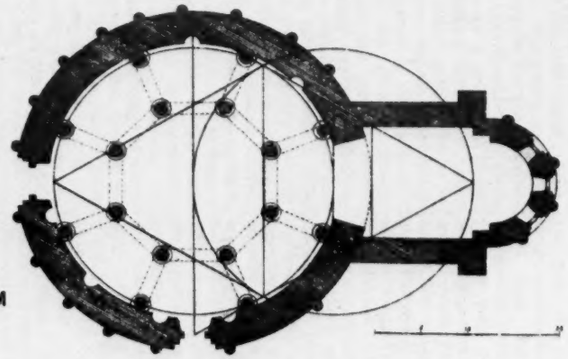
There is a view of this Church in Fergusons History of Architecture Vol I Fig 573



— Ground Plan of Oster Lars Church — BORNHOLM



— Ground Plan of Chalden Church Surrey —

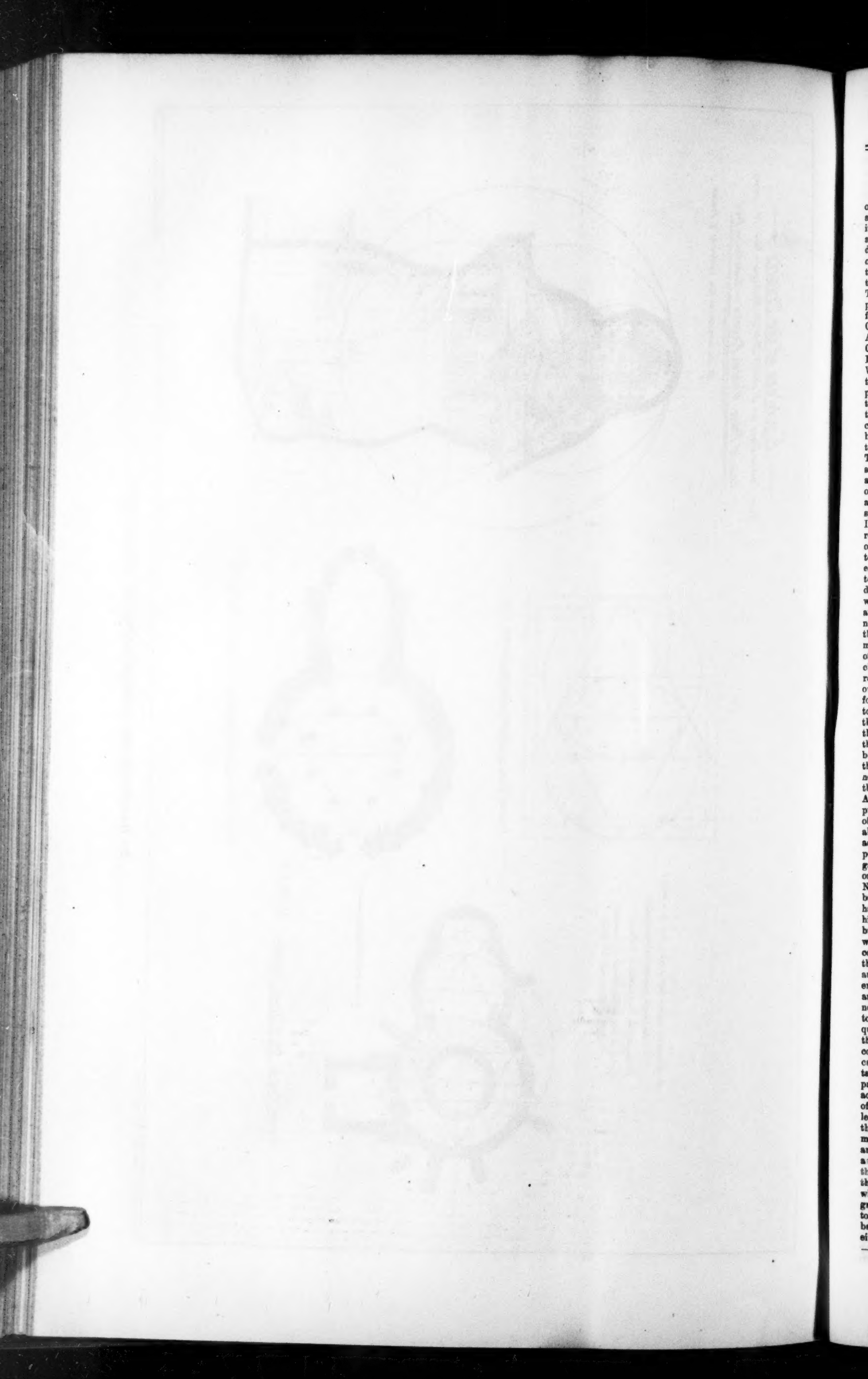


— Ground Plan of San Thomaso in Limine Bergamo —

Whiteman & Bass. Photo-Litho 236 High Holborn.

Wyman & Sons. Printers. Gt Queen St.

TO ILLUSTRATE MR. DOBSON'S PAPER ON "SYMBOLISM."



THE NEW EXAMINATION, AND WHAT IT INVOLVES.*

Now that we have gained some idea of the object which the Examination may be understood as proposing to itself, and of the general course it is to take, the question still has to be answered, How will it turn out? A great deal depends upon the examining body. This consists of a board of not less than five or more than twelve Fellows of the Institute. The names of the members of the first board are as follow:—The president, Mr. Street, R.A.; the three vice-presidents, Mr. Hayter Lewis (Emeritus Professor), Mr. Horace Jones, and Mr. Ewan Christian; the honorary secretary, Mr. Macvicar Anderson; and Messrs. James Brooks, Arthur Cates, E. A. Grüning, E. H. Martineau, E. R. Robson, Alfred Waterhouse, A.R.A., and T. H. Watson. This board will, no doubt, feel bound to carry out the statement in the published programme:—"It is intended that at first the test shall not be severe." The examiners under the Building Act form a board of very similar constitution, and no doubt the useful work done by that board has influenced the decision to extend the present examination to a similar body. There will be some little difficulty in keeping the standard uniform, and there may be some trouble at first in getting so large a board into working order; but I am inclined to believe that a tolerably numerous examining body like this offers a safeguard to students against violent fluctuations. If from year to year new men are elected to replace the retiring members, still the majority of the board will remain from one examination to another; traditions will, to a certain extent, establish themselves; and, in all probability, a tolerably uniform standard and mode of procedure will be preserved. The first examinations will be looked forward to with great interest; and to pass on one of the earlier occasions will, no doubt, reflect credit, and even distinction, on those who do so. Very many gentlemen who might, one would have thought, have been sure of success, have preferred to enter on the old principle, but some of them will, I believe, come to regret that they had not more confidence in their own powers. It would perhaps be a wise thing if, for two or three years, the examination was, so to speak, made retrospective, that is to say, thrown open to gentlemen already Associates, so that some of those now in the body might have the opportunity of adding what will, no doubt, be a real distinction to their names. Of all the things which may be said to be involved in the new examination, nothing is so self-evident as that it must be prepared for, and that this Association possesses the means of aiding in that preparation to a very large extent. Three sorts of preparation may be very easily recognised, as all useful, in fact, necessary. First, that practical acquisition of professional knowledge, and the power to make plans and perspectives, which is gained in an office and on the works, in practice on one's own account, or as an assistant or pupil. No one must hope to pass such an examining body as that Board at Conduit-street unless he has had sufficient practical training to enable him to do all the routine work of an architect's business, and some, at least, of the exceptional work. No one could, I imagine, go up from college, or classes, or any sort of instruction that is purely theoretical, and hope to succeed, any more than a medical student could pass his examination without having walked the hospital; and it will hardly be easy for those who have never done any work on their own responsibility to master this, the practitioner's, side of the qualifications sufficiently for success. Secondly, there is theoretical knowledge of materials and construction, of history, and of what one may call the theoretical drawing, so far as the details of one style go. This must, equally with practical routine, be mastered, and for the acquisition of this, pupilage and practice neither of them supplies much opportunity. Classes and lectures, and private study, must be used with the view of learning theory. Thirdly, and by no means of least importance, there is practice in answering papers of questions, and in replying to a *viva voce* examination,—in short, the skill to use the knowledge acquired. I propose to say something on each of these three heads. First, as to what we have termed the routine of practice. The greater number of those who are likely to desire to become Associates are probably more likely to be familiar with this than to be quite safe in either of the other two branches of preparation. Sharing for some years in actual work, or in carrying out a single building of one's own, will give good opportunities for becoming familiar with an architect's work; and the only hint, perhaps, that need be given, is to suggest to gentlemen who are pupils and assistants the importance of keeping their attention awake to all that goes on within their reach. The practical subjects which are most accessible to one man will be least so to another; but, on the whole, dealing with ruinous and dangerous structures, and planning for special purposes, appear to be the two most likely to lie a little wide of the range of many architects' pupils. As to the ruinous structures, they, as I have already hinted, occur from time to time, and if a young man is on the look out for information, he may be able to learn a good deal even from a single case of this sort. As to designing, that is mainly learned by practice. Any one can exercise himself in planning if he pleases, especially now that so many prizes are open for such work. But on this part of preparation, let me point out that the recent formation of a class for the study of planning and specification writing, and the two Classes of Construction and Practice, ought to aid members of the Association very materially in their acquisition and systematising of what may be termed practical knowledge. Perhaps it would be right to add the hint that some acquaintance with iron construction will probably be expected now that we have fairly entered the last quarter of the nineteenth century. The candidate at such an examination ought, at least, to be prepared to sketch iron beams correctly, and calculate their sections, in addition to being familiar with timber, brick, and stone construction. The second part of my suggestions as to preparation for the examination referred to Theoretical Knowledge. Here, I think, there is room for a great deal of improvement in our methods of instruction, and I venture, even at the risk of giving offence, to say that much of our modern architecture has suffered in consequence of defects in this instruction. Probably the greatest service which the examinations can possibly render will be their causing many pupils and others to learn something of the history of our art, and to acquaint themselves minutely with a little bit, at any rate, of that art. My own profound impression is that a good, familiar knowledge of some of these things is of the greatest possible value to the architect, and that the question whether he shall rise or not in his profession depends upon his mastering a few things, which he does not see are likely to be immediately useful,—such, for example, as drawing the human figure, in addition to the things of which he has need at the moment. But many of the younger among us do not seem deeply penetrated with this idea, and for them it will, as I have hinted in an earlier part of the paper, turn out to be a great advantage that now something has arisen which will compel a little attention to theory, and art history and architectural study of the higher kind. This, however, is a digression; the immediate subject before us is to find out how history and the science of construction must be studied, and your committee has, very wisely,—as I, at least, who am myself an instructor, must admit,—determined that some direct instruction shall be afforded here in these subjects. You are, of course, all of you, aware that two courses of lectures, one of which is to be a kind of companion to the subjects in the Elementary Class of Design, and the other similarly to accompany the subjects in the Elementary Class of Construction, are arranged, and indeed have already begun, with every promise of success. I do not think these subjects could have been entrusted to better hands than those of Mr. Tarver and Mr. Blashill respectively, and the only thing to be regretted is, that it was not possible to make each course longer. Still, as the lectures are delivered at considerable intervals of time, as they are associated with the subjects for study in the two classes, and as it will be possible for you, if you are industrious, to carry your study of each subject further than Mr. Blashill or Mr. Tarver can, within the space of an hour's lecture, take you, these courses may enable you to acquire a very considerable amount of knowledge respecting the subjects treated of. Mr. Tarver's series includes, after his introductory lecture, all those styles (or at least the most prominent of them) which combine to connect the work of the present day with that of the most artistic nation on the face of the earth. The Greeks fixed for all time a very large part of the architecture of civilised communities. Not that we, or those who went before us, are wise if we attempt to build in Greek, but that each style has been founded on the one which preceded it, and all alike inherit from Greek originals most of their features. The Roman, we all know, was a coarse rendering of Greek art, with the addition of the arch. The Romanesque, Byzantine, Lombard, and Rhenish are all children of Rome. The Gothic styles are their immediate descendants, and the Renaissance, the last in the series of Mr. Tarver's subjects, is a return to Roman forms, animated by a modern spirit. This is the tale of architectural history, as it affects ourselves, told in a sentence, and I sincerely hope you will all hear it told far more completely in Mr. Tarver's class. Not less comprehensive is the scheme of Mr. Blashill's constructive lectures. The first two relate to the foundations and walls of a fabric, the subjects being excavator, bricklayer, and mason. The next two relate to the completion of its carcass, namely the work of the carpenter and the tiler, and they take in that of the plasterer. The remaining four take in the most important parts of the finishing of a building,—those of the joiner and ironmonger, smith, plumber, painter, and glazier. Under the head of plumbing you may be sure that you will, from Mr. Blashill, not only get some advice as to the construction of flats and gutters, and so forth, but an account of those methods to which I have already had occasion to make allusion, that modern skill has brought to bear on the sanitary condition of dwelling-houses. The plumber has heavy responsibilities upon him; not only has he in times past set fire to many a cathedral spire and roof, but in our own days his shortcomings have been followed by disease and fatality. How to deal properly with plumber's work means really the management of water-supply, of drainage, and of sanitary fittings,—in short, the protection of the inmates of a dwelling from sewer-gas. Perhaps it may not be out of place if I add the suggestion to members able to attend these courses of lectures, that they will be wise to take the opportunity this session, and not to postpone their attendance till another. The courses may possibly not be repeated; or, if repeated, they may be in a different mould. The opportunity is presented now, and is a very valuable one, and no one will regret the very moderate fee, and the very moderate sacrifice of time which attendance on both these series of lectures would involve; and even though one in the Construction course and two in the Art course are already given, that circumstance will not prevent attendance upon the remainder from being most desirable. The third point to which I drew attention was practice in examinations. It is possibly a weak point in the Architectural Association system that there is not a system of examinations connected with it. The experience of University College shows conclusively that the examination at the end of the session acts as a stimulus, and also helps the student to gain a command over his own resources and his own acquirements. And though I feel that I am more fortunate than my two friends just named, not only in having to treat substantially the same series of subjects in three times as many lectures, but also in having an examination and conspicuous prizes to point to, I cannot but see that the Association, if it chose, might do more than it is easy for University College to attempt in the way of examination-practice, if I may use such a word. No one can do full justice to what he knows in an examination, whether by papers or *viva voce*, unless he be somewhat in the habit of answering questions, and answering them, so to speak, under pressure. The members of your new History Class, and those of the Construction Class, will probably, both of them, have an opportunity of attending an examination, or perhaps more than one, and they will be wise if they all avail themselves of that opportunity when it comes, and prepare for it well beforehand. In addition to this, however, some arrangement to afford practice in answering an examination paper on architectural subjects, within a certain limit of time, and without turning to books of reference, if it could be managed, would be very serviceable to intending candidates, as tending to give them confidence, and to show to them where their weak points lie, in time to apply a remedy. Such an arrangement would be quite practicable here, and would surely be worth attempting. One measure which has been from time to time strongly advocated in this Association is cer-

* By Professor T. Roger Smith. (See p. 691, *ante*.)

tainly closely allied to the New Examination, but is not involved in it. I allude to a diploma for architects. The two things resemble one another so much that we are apt to forget how widely they differ. It is not unlikely,—at any rate, not impossible,—that the new examination may be found to afford the chief advantages of a diploma without some of its obvious disadvantages. Take, for example, the difficulty of deciding what is, and what is not, to be prohibited if a diploma is granted. The only act which could well be taken hold of is the certifying for advances or payments to a builder; and this, it is obvious, has to be done by engineers, naval architects, and many other classes of practitioners, so that a prohibition could be readily evaded. But if the result of the examination is to establish publicly that the Associates of the Institute are a body of architects in whom the public can place confidence, it may very possibly turn out that Associateship will be sought by every architect of skill sufficient to pass the examination, and will be accepted by the public as equivalent to a diploma. It may, on the other hand, very possibly pave the way for the grant of such a document. At any rate, what we have to consider to-night is not the diploma question, but the examination question. If once we recognise that, quite apart from any other measures or ulterior consequences, the examination ought to result in raising the status of architects, in procuring a better estimation of them by the public, and in rendering them more really deserving of public confidence, we surely must recognise something which we are glad to see established, and which we feel ourselves bound to support, by promoting the candidature of the best men in the Association, and by assisting them in the preparation. It must not be forgotten, in conclusion, that, like every untried measure or new departure, this examination is an experiment, and may fail. One serious, or at least possible, risk of failure seems to lie in the fact that so many young men have avoided the examination by becoming Associates under the old rule. The result may very possibly be that fewer candidates will, at first, be forthcoming than there ought to be; but I have every confidence that even if this is so, the Institute will persevere, and that the good sense of young architects will make them soon come forward in sufficient numbers. There can, in that case, be no doubt of success. Were the examinations to fail, the failure would throw us back twenty years, perhaps fifty years. On the other hand, if they succeed, we shall see established in our midst what ought, under good management, to prove a powerful agency for good. The consequences ought to be better education and greater skill. The architect's fitness for his work ought to be at once more assured and better recognised. The general estimation in which our profession is held by the public ought to be proportionably raised. Let us all, each one as he can, endeavour to contribute to this result.

In the discussion which followed,

The President (Mr. Aston Webb) said he thought all the members would agree with him in thinking that Professor Smith's paper was a most valuable and useful one. The Association was glad of that opportunity of congratulating the author upon the fact that he was now the Professor of Architecture at University College. All who intended to go in for the New Examination could not but feel that it was of great advantage to them to have the hints and advice which Professor Smith had given them with so much authority and, at the same time, with so much kindness. The partial failure of the Voluntary Examinations at the Institute tended to raise some doubts as to whether the new Obligatory Examination would be as successful as could be desired, but whatever might be its success or failure, the Association had done, was doing, and would continue to do, everything in its power to make it a grand success, feeling that if it were so it must be to the advantage of the profession. He was glad to say that there was a large number of the members of the Association who were prepared to go in for the new Examination in due course. He thought, however, that one mistake as to a point of detail had been made, and that was in its having been arranged that the first obligatory examination was to be held some time in the next spring, before the Association's special courses of lectures were over, and before the courses at the University and King's Colleges were completed. He did not know whether that arrangement could be altered now, but he certainly thought it would be desirable to postpone the first examination until much later in the year,—to the time, in fact, when it was proposed to hold the second examination. Much,—very much,—depended on the first examination being successful. Professor Smith had stated that the object which the examiners would keep before them would be to make the examination of such a character as to ensure that the men who passed should be competent to practise as soon as they had passed. If that was the case, it would add to the value of the examination, but would also add to the responsibility of the Institute.

Mr. W. A. Pite said they had been gratified at hearing the Examiners' and Professor's view of the question, but the students' view of the subject must not be lost sight of. He thought that students had been "whipped-up" to the proposed examination a good deal. They had been assured that to pass it would be to gain a very great prize, but, after all, now that the syllabus was published, it did not appear to him that those who succeeded in passing would do anything very great. It seemed to him that when a man had passed it he would not be anything extraordinary. He would only be an ordinary architect, or a decent building surveyor with a dash of art thrown in. For his own part, he was of opinion that the Examination ought to be more full,—indeed, much fuller, with regard to art,—and he should like to see 500 out of the possible 600 marks attainable devoted to art. He moved a vote of thanks to Professor Smith for his able paper.

Mr. Blashill, in seconding the motion, spoke of the services which Mr. Douglass Mathews had rendered in bringing about the examination. The passing of the Examination would be most valuable not only to those who intended practising for themselves, but to those who intended to act as assistants.

Mr. Vacher, in supporting the motion, said he hoped that those who succeeded in passing the Examination would not, if they applied to architects for employment, have their superior claims passed over, as had been done within his own experience in the case of some of those who had passed the Voluntary Examination. He hoped that the examiners would discourage eccentricity in design.

Mr. S. Steward Smith (of Reading), Mr. F. H. A. Hardcastle, and Mr. J. Douglass Mathews having each made a few observations,

Professor Roger Smith, in replying on the discussion, observed that he did not think the grounds put forward by the President were sufficient to warrant the postponement of the first Obligatory Examination. Notice had been given of what was intended for the last two years, and the programme had been published some months ago. The question had been raised whether the certificate of having passed the Examination would necessarily imply perfect fitness to practise the profession as an architect. No doubt the public would so regard it, but the Examination merely professed to ascertain the qualifications of candidates for admission into the membership of the central society of the profession. There would be less difficulty in the present tolerant age in obtaining impartial judgments on questions of art from the Examiners. "Eccentric" designs would not necessarily be rejected unless they were accompanied by marked defects in planning and construction. As to the relative proportion of marks required to be obtained by the candidates in each section, he thought, as the prospectus of the Examination was at present worded, the candidate would be entitled to pass if he obtained 300 marks, however distributed, out of the maximum of 600. Possibly the Examiners would, after a time, prescribe the minimum number of marks to be gained in each subject.

SURVEYORSHIP ITEMS.

Bridgwater.—There were ninety-nine applications for the post of borough surveyor, from which a selection of four was made, viz:—Mr. Franklin, Reading; Mr. Baker, Malden; Mr. Laffan, Croydon; and Mr. Tylecote, Halifax. These gentlemen were interviewed by the council at their meeting on the 2nd inst., and Mr. Laffan was appointed.

Finchley Local Board of Health.—Francis J. Bancroft (Highways Department, Islington Vestry) was, on Monday last, selected for the position of junior in the surveyor's office of this local board.

OUR CATHEDRALS.

Sir,—My completion this past summer of a tour (carried on at intervals over a few years) of all the English and Welsh cathedrals seemed an appropriate occasion for gathering up into a paragraph or two for the pages of your valuable journal some of those notes and queries suggested to my mind by the present condition of these interesting fabrics,—and while I am well aware that the same worth cannot attach to these comments as if they came from the pen of a more competent writer, yet, if you will kindly allow them space, I think they may prove acceptable to some of your readers, and perhaps elicit a little information.

Closely linked with the remembrance of *Bristol* is a strong feeling of commendation for the energy displayed in bringing to a completion the building of an entire nave, probably the most important work among our cathedrals which this generation has witnessed. One would like to see the three towers finished, giving a distinctive character to the exterior. There is a movement just now on foot to bring the south-west tower up to the level of its fellow; but what of the pinnacles and parapet of the tower at the crossing; where are they gone and in what manner are they to be replaced? And what hope is there of the general exterior being cleaned, which is so much needed? Is the considerable remaining cloister to be restored and rebuilt as a quadrangle?

Lincoln.—The general condition of this glorious minster at present calls loudly for attention to other parts besides the west front. The nave and transept vaultings, so beautiful in design, need cleaning, and unless the eye deceives, they are covered with plaster, which would account for the many cracks discernible. May it not have been left for the builders of our own time to complete the cloister, after first sweeping away the utterly worthless Classic addition? The interior stonework of the chapter-house does not strike one as being in a good state of preservation.

Bangor.—This little cathedral, so ungainly in days gone by, presents now a really handsome appearance within. It is a pity that the exterior is not yet adorned with a completed central tower, even if it be without that pyramid of slate shown in the design. The canopies and stalls in the choir are very effective, and a credit to the present school of wood-carving. A reredos is still wanting.

York.—A visitor to the minster, strongly impressed with the conventional preference for this particular cathedral, will probably find that its splendid exterior comes up to all his expectations. Within, a glorious ideal is presented; but how faulty are many of the details. The vaulting over the nave, for instance; the absence of any vaulting beneath the western towers,—indications that the complete realisation of the original conception is still left to a future day.

Rochester.—Much has been done in the choir and transepts, with happy results. It is a pity for the hands of the restorer to be stayed just at this stage. Most of the eastern gables want correspondingly high-pitched roofs, and Mr. Cottingham's tower at the crossing may have to be improved away. So much the better. It is stated that a new central tower is seriously contemplated. One of worthy design would largely contribute to make this building what it certainly is not at present,—externally pleasing.

St. David's.—The many who have not made a pilgrimage to this rather inaccessible little city, but yet feel an interest in the ancient fabric, which is the finest and largest of the Welsh cathedrals, will be glad to hear of repairing works successfully carried through, not a bit too soon. Much, of course, still remains untouched. How far it may have been an advantage to take out the great west window, in the Debased Perpendicular style, to be replaced by modern Norman lights as a memorial to Bishop Thirlwall, is a question on which there will be two opinions. As to the fittings, it is lamentable to come across fragments of the old organ lying about which have been in the same position for years, and to learn that funds are not forthcoming to rebuild it or erect a new one. Fortunately no other cathedral in England and Wales is without an organ.

Salisbury.—Generally speaking, it will be matter for congratulation that the works of restoration have left this cathedral in, to say the least, a state of good repair. No one is

likely to regret the removal of very poor stall-work and canopies from the choir; but *apropos* of the present handsome stalls, are they not to have canopies? Salisbury, from the peculiar lightness of its architecture, and on account of its numerous windows, strikes one as being a particularly cold cathedral, and a row of delicately-carved canopies would give a warmer aspect to the choir. It is to be hoped the double organ will be supplied with cases before long, or treated after the same system of decoration as the instrument at Durham.

Chichester.—Part of the design of the reredos has still to be carried out. Here, again, the question must be asked, how long the very prominent skeleton of the organ is to remain unclothed? And what a pleasing feature this might be made in its pendent position from the north wall of the choir,—a counterpart to that at Ely.

Chester.—After such a transformation as has been carried out here, it may seem too much to expect further effort just now; but the condition of the south transept externally cannot fail to be a general eyesore, and the completion of the south-west tower would greatly improve the effect of the west front.

Gloucester.—The organ surmounting the screen, and which is so conspicuous looking down the nave, is an incongruous, if not ugly, object here, with its three uprights with flattened heads. Something of the lightness of design adopted for the case at Lincoln might be an improvement. Others have suggested dividing the organ; but, would this cathedral look well with an almost unbroken vista, considering the contrast between nave and choir?

Hereford.—Mr. Wyatt's feeble west front is surely doomed for some future day, and perhaps the present generation may live to see a western tower in its place, as in years gone by. It may be remembered that the subject was revived at the last triennial festival in this city.

The general impression left on the mind after a ramble among the cathedrals is that there are very many comparatively trifling works, finishing touches, which through long years have still remained unaccomplished. Is there not some want of energy now-a-days in persevering to the end of great undertakings? How disappointing it is to revisit some grand minster after a long absence, and find still the unchiselled blocks or the temporary fittings; and how lamentably common it now seems to be to leave off at the first stage of a tower, so that for half a century or more it becomes a by-word that "these men began to build, and were not able to finish." Of course the excuse is the pecuniary difficulty; but let it once be realised that this is a *public*, and not exclusively *church*, work, and English money will not be far behind English spirit in the common cause. Art is, in its many forms, more cultivated now than in the past; and whatever may be said in disparagement of "Victorian Gothic," still there is no doubt that this age has, to a large degree, been imbued with the genuine feeling of the old cathedral builders. Now is the time, then, for fresh effort, before the capricious fashions in art-taste dictate the special worship of some other style in architecture, and our children, perchance, turn out to be as bad "Gothic" distorters as were their grand-parents. But a little reverent care, a season of patient labour, and we shall be able to leave to posterity, in unimpaired splendour, those cathedrals which are such an ornament to our country, while we may with affection and with pardonable pride inscribe upon their walls the legend that I yesterday read over a porch in Wimborne Minster:—"Our holy and our beautiful house in which our fathers worshipped."

D. JOHN D. CODNER.

THE INTERNATIONAL EXHIBITION OF SMOKE-PREVENTING APPLIANCES.

THIS Exhibition has now been open for more than a week, and is in fairly complete order, although a blank space here and there shows that some would-be exhibitors are either very dilatory or very unfortunate in not being able to take up the positions allotted to them. We have authority for stating that the executive committee will be glad to entertain proposals for receiving and exhibiting (even if only during the last week of the Exhibition) any novelties in the way of inventions or processes which come strictly within the scope of the exhibition, the object of the committee being to elicit information on the subject of smoke-prevention and fuel-economising. We are glad to learn that the attendance of visitors has so far been very good, and in excess of anticipations. The fact may be usefully noted that the Exhibition will remain open every week-day until further notice from 10 a.m. to 10 p.m. We trust that it will be largely visited by our readers, especially by architects, builders, and manufacturers. We have no doubt whatever that in the attainment of the ends which the promoters of the Smoke Abatement Exhibition desiderate, not only will health be promoted, but fortunes will be made by those who succeed in perfecting, and saved by those who adopt, stoves and furnaces which shall not only consume their own smoke, but which shall be far more effective, in proportion to the heating power stored in the fuel, than are most of the appliances in common use at the present day.

We take this opportunity of mentioning one or two exhibits in addition to those already referred to. Messrs. Rosser & Russell (Block XVIII.) exhibit the "Leopold" reversible or revolving grate, which consists of a circular cage or fuel basket revolving on a pivot. It is fitted with two hinged gratings, so that whichever grating is uppermost can be opened for the admission of fresh fuel, which by a half-revolution of the basket will be brought under the lighted fuel so as to consume the smoke and gases evolved from the fresh fuel. This firm also show their warm-air ventilating grate, and a cooking-range, hot-closet, and heating apparatus. Mr. Thomas Goodchild, F.R.I.B.A., exhibits, at the north end of the eastern arcade, a full-size drawing of his "Economic" stove, patented by him, we understand, in 1857, but the patent of which he allowed to lapse. It is strikingly like another stove more recently patented, and shown in another part of the Exhibition. At the north end of the western arcade Messrs. Mintons exhibit a drawing showing plan and section of patent smokeless pottery ovens, which appear to be not only admirably adapted for preventing smoke, but for keeping the temperature easily under control. We mentioned last week that the conservatory is illuminated by the Siemens gas-burners. A description of this ingenious invention would not be intelligible in few words unless accompanied by a section, but we may say that it is based upon the principle of the regenerative gas furnaces almost universally used in the smelting districts, and known to all as the Siemens furnaces. It is claimed that from this burner can be obtained with equal facility and economy lights varying from 30 to 1,000 candle-power, but it is in contemplation to construct both larger and smaller sizes.

THE FALL OF A HOUSE AT MAIDA VALE.

IN regard to this casualty, reported by us three weeks ago (see p. 650, *ante*), the Building Act Committee of the Metropolitan Board of Works presented the following report at the meeting of the Board on the 2nd inst.:—

"The Board on Friday last referred to your committee a letter from Mr. G. Lushington, Home Office, dated 17th of November, 1881, with a letter from Mr. T. H. J. Shadwell, relative to the fall of a half-finished house and shop in Clifton-road, Maida-vale. Your committee have received from your Superintending Architect a report upon the subject, prepared in pursuance of the resolution of the Board, and also a report from Mr. Horace Gundry, the District Surveyor for Paddington. The house in question was the westernmost of a block of four in course of erection on the north side of Clifton-road, and it fell suddenly between five and six o'clock on the afternoon of Saturday, the 12th ult. The bricks were of fair quality, and the mortar, which was composed of lime and brick-rubbish mixed in a pug-mill, as required by the Board's By-law, was hard, but deficient in grit. It appears that a kind of dumb well was formed on the site to receive the surface-water, and that a drain was taken from this well to the sewer in Clifton-road. The mouth of this drain was about 3 ft. from the south-west angle of the fallen house, and was below the level of the concrete under the party-wall. Your Superintending Architect is of opinion that the fall of the house is not to be attributed to the use of improper materials or defective workmanship, but that the accident was occasioned by the excavation for the drain at the south-west angle of the house, the water collecting in which so saturated the soil as to cause it to subside under the weight of the south quoin of the party-wall, and the slipping or failure of this quoin brought down the house. Your committee, therefore, recommend that the Home Secretary be informed in accordance with the foregoing report, and that they be authorised to consider the advisability of inserting a clause in the proposed Bill for the amendment of the Building Act, requiring all drains to houses to be laid in before the walls are commenced, and the junctions made and the excavations filled in to the satisfaction of the District Surveyor; and a further clause requiring, in the case of quoins of party-walls and piers carrying heavy weights, that the depth and width of the concrete be increased beyond the dimensions set out in the Metropolis Management and Building Acts, 1878."

The report (which bears out the remarks we have already made) was adopted without discussion, on the formal motion of Mr. Ebenezer Saunders, chairman of the committee.

ALHAMBRA THEATRE, LEICESTER-SQUARE.

SPEAKING, last week, of the re-opening of this well-known building, we said the dome was to be illuminated by the electric light, and that we would report on the effect. Certainly the effect was very striking. In place of the dark and dingy void heretofore seen on looking up, the dome now presents the aspect of a bright blue sky, "fretted with golden fires." The light consists of four of Siemens's arc lights, the dynamo-machine of which is driven by one of Tangye's steam-engines. These lights are enclosed in a stained-glass lantern, which produces a jewelled effect, and sends a warm light down on the auditorium, whilst the pure white light which is thrown upwards on the glittering surface of the dome, is diffused by reflection throughout the building.

The coloured decorations throughout have been renewed with good taste. The principal structural works which have been undertaken consist of the widening of the proscenium, the improvement of the accesses and staircases to the stalls, and an examination and strengthening of the main timbers and supports of the building. The width of the old proscenium had been limited by two of the iron columns supporting the main roof, but these have now been removed, and new and more substantial columns, carrying a deep iron girder under the base of the dome, have been substituted. The operation was an extremely delicate one, and required a profusion of solid shoring over the stage, which, together with the forest of scaffolding raised for the painting of the dome, produced to those who knew the building a most peculiar appearance. We may hereafter be able to describe and illustrate this operation. The result of this alteration has been to widen the proscenium, structurally, some 10 ft., but, unfortunately, for want of time, the benefit of this is not yet apparent to the public, and the old proscenium screen has been left in position until a new one, more in accordance with the style of the house, can be prepared. The floor of the stalls has been raised slightly, and the next improvement should be the lowering of the floor of the orchestra so that the popular and portly conductor, Mr. Jacobi, and sundry bass viols, may no longer intervene between the spectators and the actors. The works to the stage have included the completion of a fire-proof concrete screen between the stage and the auditorium.

Advantage was taken of the closing of the house thoroughly to overhaul the whole of the construction, and the directors called in a civil engineer, Professor Kennedy, of University College, to consult with their architects on the subject. The result has been that considerable works for the strengthening of the dome have been done, and means taken to ensure the safety of the fabric.

All the works were done by the contractor, Mr. Brass, of Old-street, St. Luke's, with the assistance of his foreman, Mr. Jones, for the constructional work; and his sub-contractor, Mr. W. Homann, for the decoration. The upholstery and carpeting have been supplied by Messrs. Tyler & Son. The stained glass lantern for the electric light was manufactured by Messrs. Pitman & Son. The contract was completed within the time agreed upon, the men working day and night in alternate gangs, and the whole of the works were done from the designs and under the superintendence of

Messrs. Perry & Reed, of 9, John-street, Adelphi, the architects to the theatre.

The house was re-opened on Saturday last, the 3rd inst., with the spectacular opera "Black Crook," produced with great splendour and complete success.

UNDERGROUND DWELLINGS IN LONDON.

At the meeting of the Metropolitan Board of Works, on the 2nd inst., the Building Act Committee brought up the following report:—

"In pursuance of the Board's resolution of the 11th of November, your committee have considered the question of the duties of District Surveyors under section 103 of the 18 & 19 Vict., cap. 120, in reference to rooms in the basements of buildings used as dwellings. From a report presented to your committee by your Solicitor and Superintending Architect, it appears that each District Surveyor is bound to report to the Board, and also to the District Board or Vestry, in the months of June and December in every year, and at all other times when required so to do by the Board or Vestry, any room of a house in his district the surface of the floor of which is more than 3 ft. below the surface of the footway of the adjoining street, and any cellar, where such room or cellar is or has been occupied separately as a dwelling, which does not comply with the requirements contained in the 103rd section of the said Act. Your committee recommend that a letter be sent to each District Surveyor by the Clerk, informing him thereof, and asking why returns have not been made to the Board as required by the Act, and requiring returns to be made in the present month of December, and in future in June and December of each year."

Mr. J. Ebenezer Saunders, chairman of the committee, in moving the adoption of the report, said it was most important, in the interest of public health, that the District Surveyors should do their duty with regard to this matter.

Mr. Edwards, as representing Marylebone, coincided. In his parish recent revelations had shown that in streets where one would have little expected to find them, underground dwellings existed.

The report was adopted.

We think it right to observe that the District Surveyors are not the proper body to carry out this requirement; their duties are structural,—not matters of police. Moreover, the Act does not give them power to enter at such times as would be necessary to prove occupancy.

PATENT RECORD.*

APPLICATIONS FOR LETTERS PATENT.

5,053. J. A. Davie, Ebbw-vale. Preparation and combination of materials for bricks, tiles, slabs, &c. Nov. 18, 1881.

5,064. E. Homan, Turnham-green. Construction of fire-proof floors. Nov. 19, 1881.

5,067. W. S. Welton, London. Appliances for economising fuel and consuming smoke. Nov. 19, 1881.

5,077. H. H. Banyard, London. Water-meters. (Com. by W. Germutz, Vienna.) Nov. 21, 1881.

5,091. H. Defty, Middlesbrough. Generating heat by gas or oils for heating buildings. Nov. 22, 1881.

5,095. W. R. Lake, London. Manufacture of bricks. (Com. by W. W. Potts, Bridgeport, U.S.A.) Nov. 22, 1881.

5,111. J. R. Hargreaves, Haslingden. Hot-water fittings in houses. Nov. 23, 1881.

5,118. H. J. Haddan, Kensington. Construction of roads and pavements. (Com. by J. J. Salvat, Morceux, France.) Nov. 23, 1881.

5,142. L. A. Groth, London. Apparatus for warming or heating. (Com. by C. Östlund, Stockholm.) Nov. 24, 1881.

NOTICES TO PROCEED

have been given by the following applicants, on the dates named.

Nov. 22, 1881.

3,116. G. Farness and J. Robertshaw, Manchester. Appliances for raising, holding, or lowering blinds. July 18, 1881.

3,156. T. E. Parker, Battersea. Open fireplaces, &c. July 20, 1881.

3,183. W. Cunnington and W. Cunnington, jun., Chelsea. Decoration of paper-hangings, &c. July 21, 1881.

3,223. T. Barnby, Birmingham. Folding or camp furniture. July 23, 1881.

3,303. J. H. Johnson, London. Manufacture of artificial stone and marble, &c. (Com. by La Société Anonyme de Certado, Paris.) July 28, 1881.

3,746. E. Kaulbach, London. Apparatus for consuming coal, &c., for heating purposes. Aug. 27, 1881.

Nov. 25, 1881.

3,170. R. R. Gibbs, Liverpool. Apparatus for cooling, cleansing, and purifying air. July 21, 1881.

ABRIDGMENTS OF SPECIFICATIONS

Published during the Week ending November 26, 1881.

1,671. G. H. Flood & D. Young, London. Apparatus for regulating and controlling the flow of liquids.

This is an improvement on Patent No. 2,466 of 1880, in applying the wedge to valve-cocks and ball-valves. (*Pro. Pro.*) April 16, 1881. Price 2d.

1,680. A. Tyson, Ulverston. Hot-bed frames or conservatories.

The roof is cover-glazed and formed in two parts, jointed in the middle. The gable ends are hinged frames, to fold down out of the way when the top cover is let down flat, and to stand up when the cover is to form a slanting roof. These are all secured by hooks, &c. April 16, 1881. Price 4d.

1,682. L. Wall, Islington. Apparatus for regulating supply of water to water-closets.

This is an oscillating receiver, which is placed in the tank and filled through a ball-valve. The receiver is hopper-shaped, and when full it tilts over and discharges its contents, at the same time closing the ball-valve. When empty it returns to its place and is again filled. April 16, 1881. Price 6d.

1,714. C. R. Stevens, Lewisham. Apparatus for heating, cooking, &c.

For supplying hot water to baths, &c., a boiler is used with two flues, through which the heated gases from the burner beneath pass up and down before they escape to the flue-pipe. The heated water, therefore, ascends a flow-pipe into the tank above, from which it again descends through the return-pipe until it is all duly heated. This invention also includes a boiler for creating steam for blast purposes for cooking, &c.; a gas-regulator for the heating apparatus, and tanks for circulating water-heaters, the bottom and sides whereof are held together by channel-iron. April 20, 1881. Price 8d.

1,747. W. R. Lake, London. Castors for chairs, tables, &c.

These castors are rendered elastic or yielding by a spiral spring placed round the stem so that the table, &c., is always in a level position, even if the floor is uneven. (Com. by A. F. Mauchain, Geneva.) (*Pro. Pro.*) April 23, 1881. Price 2d.

1,756. G. Walker, Birmingham. Fastenings for windows.

A spring catch-piece is applied to the upper bar of the lower sash, so that when the fastening arm on the lower bar of the upper sash is turned, it slips past the free end of the catch-piece and is thereby firmly locked. (*Pro. Pro.*) April 23, 1881. Price 2d.

1,757. A. M. Taylor, Lenzie. Safety-valve plugs for water heaters or boilers.

These are specially applicable to kitchen boilers. The plug is made with a passage through it and is screwed into a hole in the boiler shell. The passage is closed by a valve with an internal spindle, on the inner end of which a spring is placed. April 23, 1881. Price 6d.

1,817. W. E. Gedge, Westminster. Artificial stone.

The stone is made of sand and lime or cement, set with a solution of shellac, glue, or borax, &c., and it has a facing of porcelain to prevent porosity. Wires are imbedded in the body of the stone, whereby the blocks may be bound together or to the beams in the building. Plates of metal, rubber, or felt, &c., are interposed between the stones to prevent access of moisture. (Com. by G. Boden, Atlantic City, U.S.A.) April 27, 1881. Price 6d.

* Compiled by Hart & Co., patent agents, 28, New Bridge-street, E.C.

BUILDING STONES OF SCOTLAND.

Sir,—I have read in the *Builder* a paper read by Mr. Gowans, under the above heading, with great interest; and as he lays considerable stress on the Carmyllie Railway and the Auld Wind Mill, it behoves me to take a little wind out of this old wind-mill, and blow it a little more to the north-east. No doubt Messrs. Gowans and Mitchell did a great deal of good to the Carmyllie district in connexion with the Earl of Dalhousie, to whom the quarries belonged, and no doubt a greater trade by all the difference he has mentioned is carried on there now than was forty-five years ago, being the extent of my own memory; but the question is, have the machines or the railway contributed most to the development of the quarries? There was a time, a little beyond my memory, say just fifty years ago, when there was not a stone-planing machine in Forfarshire, but there was a gentleman, Mr. Fullarton Lindsey Carnegie, who engaged the son of a loom and shuttle maker to come from Arbroath to his estate at Leysmill to fit up and work circular saws for cutting up timber, and in this capacity he invented the Forfarshire stone-planing machine, and opened the far-famed Leysmill Quarries, and by the support of the said Mr. Carnegie assisted to carry out the Arbroath and Forfar railway, and had wagons and horses ready when the last rail was laid to carry on traffic betwixt Leysmill and Arbroath for months before the first locomotive (Victoria) was ready. And I may here mention that the first machine was made about the year 1833; and about that time, or a little after, the late Sir Wm. Cubitt, and many others, came from London to see them at work, and their report was so favourable that shortly after machines were sent to Valencia to plane the slate flags there, and to Lord Morley's estate near Plymouth, to Sweden and Belgium, also to Yorkshire; but in no case, except the slate, has there been found beds of flags that can be planed by these machines so well as those of Forfarshire, and before the opening of the railway to Arbroath there were six machines in operation, planing 1,000 ft. super. per day. And after this railway was started slabs were carted from Carmyllie four miles, and from the Forfar quarries ten miles, either to supply the great demand upon the Leysmill quarry-owner, or they were planed at the rate of 3*l.* 8*s.* 6*d.* per 1,000 ft.

But these were still early days, when the country was not prepared all at once to receive those improvements, any more than it was for the great feat of naval architecture of Brunel: so, under the superintendence of the inventor,—my late father, James Hunter,—the Leysmill Quarries went on in prosperity, while surrounding quarries were slack, owing to the want of machinery; and the first planing-machines erected in Carmyllie district were two, which had been sent to London to a Mr. Braithwaite to work, under licence, in a given circle with St. Paul's as its centre, but the agreement not being properly carried out, they were recovered, and erected at Carmyllie some seven or eight years before Mr. Gowans made the railway, and to this date these particular planing-machines have not been improved upon. But the inventor introduced a method of throwing over the tools at the end of each stroke, so as to preserve a cutting-edge when working on such as Yorkshire flags; and the same arrangement has since been introduced by Messrs. Coulter & Harpers. Next come the sawing and moulding machines referred to. These were entirely my invention, and they have been used broadcast all over Forfarshire, and although I have learned that a late Arbroath firm actually charged a royalty on these machines in my name to the extent of 50*l.* and 100*l.* each, yet I never received one penny out of the Forfarshire quarries, although I had four patents, all of which are being worked upon amongst those quarries.

And now, having stated a few facts as to what has taken place, I should like to look forward as to what may take place in another fifty years. There is a large deposit of very fine pavement under Turin Hill, and there is a railway station at its base, and this rock could be reached by a short tunnel from behind this station, cutting through to the back of the rock, which lies at a dip; a strong conglomerate lies over it, so that a reasonably-sized roof or chamber can be opened. But mining has not been attempted to win the flag-rock of Forfarshire, with or without the aid of machinery. But considering it has given birth to such mechanical men as James Carmichael, Dundee, inventor of the fan-blast; Mr. Bell, parish minister of Carmyllie, the reaping-machine; Alexander Shanks, Arbroath, the lawn-mower; James Hunter, Leysmill, the stone planing and boring machines, it would not be too much to expect that one will yet turn up to convert Turin Hill into a machine mole's nest, and Clocksbriggs into another Carmyllie.

Geo. Hunter.

The Wood Trade.—Messrs. James Smith & Co., of Liverpool, say, in their wood circular and prices current:—"The arrivals since our last have been 61 vessels, 49,225 tons, against 140 vessels, 103,867 tons in corresponding period last year; and 37 vessels, 15,193 tons in 1879. The demand for the month has been somewhat checked by the advance in prices of most articles, and the continued firmness of holders, who are strengthened considerably by the moderate stocks, small import, and the large number of casualties caused by the late gales. Trade generally throughout the country is better, but the prevailing complaint is that prices do not improve as quickly as was expected. If shipments are kept moderate, a fair business may be realised during the winter. Money continues firm, and the bank-rate is unchanged, ruling at five per cent. Freights continue favourable to importers."

THE INSTITUTE OF PAINTERS IN WATER-COLOURS.

THE two principal Water-Colour Exhibitions held the private views of their Winter Collections on the same day, as usual (Saturday last), but we have only space this week for a notice of one of them. We made no secret, in speaking of the last of the Institute's exhibitions, that we looked on their position as critical. The Winter Exhibition, considered that it is frankly what these winter exhibitions originally professed to be in both cases, one of sketches and studies, is more encouraging again, and contains some good things: some also of the peculiar trick-painting which certain members practised *ad nauseam*, is much less frequent or prominent. The Institute has lost by death, since its last exhibition, a member whose drawings were always pretty prominent there, Mr. Augustus Bouvier, whose very French-looking nymphs, dancing or posing always with the same mannered and coquettish grace, may have had their admirers, who must now look their last on these damsels. We say polite things to ladies at parting, even when they have been dull, and we will endeavour to make no exception in regard to these *demoiselles* of the late Mr. Bouvier's creation who now simper before us for the last time. *Valete, puellæ!*

The times are gone when Mr. J. D. Linton sent his most thoughtful work to this gallery, where his genius became known to those who can appreciate superb colouring and execution, and a dignified and thoughtful style. His strength has been expended elsewhere of late, and his one contribution, as has been the case since then, is rather a study of a costumed figure than a picture, in the sense of those he used to send. It is called "The Earl of Leicester" (217), a three-quarter length figure in a hawking costume of buff, but decorated with richly jewelled appendages, holding a hawk on his wrist. The drawing might have any other name, but the refined and delicate features are of sufficiently *recherché* type to suit the idea of the Earl of Leicester, and it is finished with exquisite softness and delicacy. Mr. C. H. Staniland, in "H.R.H." (25), suggests the idea that he has been influenced by the style of Mr. Linton in some respects, mostly in regard to colour and the general scope of the picture; it may also be called a costumed figure, that of a little child dressed in rich and long robes in which warm amber predominates, and with a ponderous wig of dark hair placed on her head, from beneath which her own blond hair shows. The face is pretty and infantile, and there is a playful effectiveness about the whole. Mr. C. Green's "Cup and Ball" (212) and "Yours Devotedly" (289) can claim to have little more interest than what belongs to lay figures well posed and clothed in effective dresses which are well painted. Miss Mary L. Gow's "An Invitation" (179) belongs to a different order of work; there is much character in the figure of the girl who writes the letter, to whom an old bookcase with its motley contents forms a carefully-studied background. Mr. G. Clausen's "An Interior" (225) is a very clever slightly-executed study, both in regard to the figure and the surroundings. Mr. Towneley Green's "Autumn" (185), a figure in mourning seated in a landscape, has a very pleasing feeling, and that careful and refined drawing of the figure which distinguishes his work; "The Young Housekeeper" (301) shows similar qualities in a portrayal of a very different scene and subject.

Among the landscapes there are many pleasant bits. Mr. E. J. Gregory's "A Calm on the Medway" (13) is a bit of soft sunlight and colour recalling to us some of Cotman's effects. Mr. Whymper's "Passing Storm" (29) is fine in the cloud effect, but wants force in the foreground. Mr. Wimperis's "Low Tide" (53) is a fine little study in the school of David Cox, and Mr. Collier's larger sketch, "Stacking Peat" (195), is as free and powerful a thing, in the same fine school, as one could wish to see. In another manner two or three studies of Mr. Mark Fisher's, especially "Meadow Land" (115), are equally redolent of the breath of nature and of the qualities of the best water-colour art. Mr. Fullylove sends three works in three different styles, all equally good. There is the picturesque of English village buildings in "Cottages in Leicestershire" (54), and the picturesque of palace gardens in "An Italian Garden" (221), and that of grandiose internal architecture in "Siena Cathedral" (286); and it is gratifying to see that this able artist, though he found a new source of effect in painting trim gardens and their lofty hedges, is not going to make this a mere receipt for constant repetition.

Among various small things, two fruit pieces by Mr. John Sherrin, "A Bough of Gooseberries" (267) and "A Bough of Plums" (310), show careful study and no little brilliancy of colour and execution. Some works there are which ought not to be on the walls of any exhibition, and one or two large works with good names which we may conclude are not painted recently or for this exhibition.

AS TO BUILDING OPERATIONS DURING THE NIGHT.

WEBB *v.* BARKER AND WHITEHEAD.

THIS was an action before Vice Chancellor Hall, in the Court of Chancery, for an injunction to restrain defendants from causing a nuisance to plaintiff by the noise of building operations during the night.

Mr. Eddis, Q.C., and Mr. A. C. Eddis, appeared for the plaintiff, and Mr. Graham Hastings, Q.C., and Mr. Warmington for the defendants.

The defendants are drapers, carrying on business at 75 to 93, High-street, Kensington, and the plaintiff is a provision merchant carrying on business on the property adjoining at 73, High-street, the upper part of his house being occupied for dwelling purposes.

The evidence was to the effect that the defendants were making certain alterations to their premises, and that the builder's workmen employed by them not only worked all day, but during the night, causing such an intolerable noise that persons residing in the house of the plaintiff were unable to sleep.

Defendants' counsel submitted that it was not the practice of the Court to grant an injunction to restrain a mere temporary nuisance. Plans prepared by Mr. Josiah Houle, the defendants' architect, were produced in Court showing the nature of the works, and numerous affidavits of a conflicting character on both sides were read, and after a lengthened inquiry the following decision was given by the Vice-Chancellor.

"The first question is as to the jurisdiction of the Court to grant such an Injunction as that granted in this case. I think that there is jurisdiction to do so under the circumstances existing. It has been said the Court must look at the matter in a reasonable point of view. I do look at it, I hope, in a reasonable point of view, and so looking at it I find that this alleged complaint which I consider to be a nuisance, is doing that which interferes with the comfortable, reasonable, and ordinary enjoyment of the plaintiff's property, and it is unreasonable for the defendants to so act. That interference, and that unreasonable interference being, doing the work during the night time, I do not consider that the plaintiff having this property, consisting in part of a dwelling-house, is bound to submit to the defendants carrying on the works in question during the time ordinarily devoted to sleeping, that is, during the night. It is for that reason the injunction was limited to the hours specified, that is, between eight o'clock p.m. and six o'clock a.m. It is said that this work is only temporary, and for a short time. As regards that I am not satisfied at all, and it does not appear how long this work is going to be continued. I hold that such an interference with the plaintiff's comfort at night times is that of which the plaintiff has a right to complain, and would have a right to complain if this case were now being heard upon the hearing of the action, and that the intermediate injury between the application and the hearing is shown to be of such a character that there ought to be the intermediate relief by an interlocutory injunction.

The next question is, whether, in point of fact, the case is made out? As to that, I think the evidence is plain that there was an interference with the plaintiff's comfortable enjoyment of his dwelling. I may say that I think the evidence of Mr. Goddard, the evidence of the governess, and the evidence of the servants, are amply sufficient to satisfy me that there has been an interference. That being so, I consider the interim order was right. It only remains to deal with the motion for committal. As to that, it is really attempted to get rid of the effect of that motion by saying "We have done nothing wrong." True it is there may have been a noise, as to which you may perhaps say "There is no evidence establishing the noise after the date of the injunction." I am satisfied upon the evidence that on the 19th there was a making of noise such as was intended to be enjoined in High-street, because I consider that the work at the place it was done being and among other things the putting up of an iron door between two portions of the entire building, after it was reconstructed, was, within the meaning of the injunction, making a noise, which was interdicted in the defendant's premises in Kensington, within the meaning of the order, and therefore the defendants must pay the costs of that motion to commit."

A New Exhibition.—The Sportsman's Exhibition is to be opened at the Agricultural Hall, London, on February 9th, and is to comprise every requisite in connexion with Coaching and Driving, Hunting and Riding, Shooting, Yachting, Fishing, Fencing, Athletics, Bicycling, Archery, and games and amusements of all kinds. The idea is a good one.

LONDON ARCHITECTS WITH PROVINCIAL WORK.

SIR,—London architects who have work in the provinces are very hard upon us poor local builders in either not giving quantities, or giving them prepared by a London, and (to us) a perfectly unknown, quantity surveyor, while it is notorious that quantities by a local surveyor are always understood better, and we have more confidence in them, which saves cost to the clients. I will give an example to illustrate what I mean.

The Government recently advertised for tenders for building a post-office in Yorkshire, but no quantities were supplied, and I employed a local quantity surveyor to measure up the work. I did not get the job, yet I had to pay him, although he admits that he has got the quantities out for four contractors (including myself), and that one of his clients is the successful contractor, and he has added 2 per cent. on the amount of the contract to pay the surveyor, who must have made 5 or 6 per cent. on the cost of the job. It would have been nearly as bad if a London surveyor had been engaged, as we should have to get a local surveyor to explain the architectural terms they employ into our local phraseology.

I particularly object to London quantities when the work is erected by subscription. I was recently solicited to subscribe towards building a chancel to our church, but I found that a London architect was employed, and that the quantities would be prepared by a London surveyor, and that if I tendered I should have to pay at least 1*l.* 1*s.* to a local surveyor to interpret the items in the quantities. I, therefore, refused to subscribe; and shall not tender for that or any other work unless quantities that we can understand are supplied, or unless an allowance is made for tenders.

I inclose my card, but wish to remain,

A SUCCESSFUL BUILDER.

CLERKS OF WORKS.

SIR,—The suggestion thrown out by one who signs himself a "Clerk of Works," for the formation of a society to be called "The Clerks of Works and Builders' Foremen's Association," will meet with approval and support by a large body of men; but if this age is one of progress, as your correspondent assures us, then we may hope the day will not be far off when architects will select their clerks of works from the rank of properly trained and qualified men, who are able to carry out their works in the spirit in which they are designed, and in every other respect fit to be their deputies and members of their profession, as they are in France, Germany, Austria, and other countries. Architects who have travelled abroad and visited buildings in progress, such as the cathedrals at Cologne, Mainz, St. Stephen's at Vienna, the law-courts there, the opera-houses at Dresden, Paris, &c., and met the clerks of works there, must be aware of the difference. It is only surprising that affairs have been allowed to remain unchallenged, all the more as architects have been only too anxious to raise the standard of their profession by proper training, examinations' diplomas, and other devices.

AN OLD CLERK OF WORKS.

LEAD POISONING.

SIR,—In your notice of Mr. Belgrand's pamphlet, laid by Dr. Saunders before the London Commissioners of Sewers, you very properly call attention to the evidence in England of evil results caused by drinking water, of a certain composition, which had passed through leaden pipes. I believe that in Berlin lead is the only metal that will withstand the destructive force of the water, whilst iron is corroded and eaten through in the course of two or three years. But what I wished chiefly to call attention to is the fact, as I believe it to be, that whilst the greatest danger may arise from the decomposition of lead in stagnant service-pipes and stagnant cisterns, according to the nature of the water and the duration of its period of change and flow, there is not the slightest danger of any sort to be feared from the flow of water through any number of miles of leaden pipes so that it be always flowing.

WILLIAM WHITE, F.S.A.

THE CASTLE HILL, GAINSBOROUGH.

Sir,—I observe in the *Builder* (p. 662) a note upon "the Castle Hill, Gainsborough." The property belongs to Sir Hickman B. Bacon, premier baronet. He is wintering in Madeira, and will probably not see your number of the 26th ult.; but I can say, on his behalf, that nothing would give him greater satisfaction than that a careful survey and examination of the earthworks should be made. The earthworks, being partly within the park, cannot be open to every passer-by; but Sir Hickman would certainly be the first to come forward and meet any proposal that might be made for an examination and survey.

Somers Clarke, Jun.

COMPETITION FOR BOARD-SCHOOLS FOR BARROW-IN-FURNESS AND ROOSE.

Sir,—The letter in your issue of the 19th of November, signed A.B., having reference to the above competition, is calculated to mislead.

The Board did decide in favour of Mr. Holtom for the Island-road Schools. They afterwards invited Mr. Holtom, of Dewsbury, Messrs. T. & W. Bennett, of Manchester, and Mr. Cox, of Kendal, to submit designs in limited competition for Roose.

In consequence of Mr. Cox's designs not complying with the instructions, the competition lay between Mr. Holtom and Messrs. Bennett, each obtaining an equal number of votes. The chairman would not give the casting-vote (having already done so on a former occasion against Mr. Bennett); eventually it was decided to refer the matter to Sir James Ramsden, whose award was in favour of Mr. Holtom.

C. D.

DISCOLOURED WATER.

Sir,—Will any of your readers tell me why my supply of water should be discoloured by rust or some similar substance? The water is obtained from a pond about half a mile away, where it is quite limpid; it first runs through a rough filter, composed of gravel and charcoal, into a small reservoir, and is thence carried in iron pipes to my residence; it is usually unfit for washing or cooking purposes unless filtered. I believe that the water supply to towns is carried in iron pipes, and I have not heard of the same complaint.

Any explanation or cure that may be suggested will be thankfully received by

A Lover of Clean Water.

TESTING TRAPS.

Sir,—Whilst on the one hand I have not the least desire to be either severe upon, or offensive to, your correspondent, Mr. Eraptage, I am compelled to respond to his letter in somewhat positive terms, and I think that perhaps the most simple and decisive way that I can do it is to ask him a series of questions, tending to assist his memory and at the same time show him where he is in error. I will proceed in this wise:—

Did he ever go to Messrs. Pullen & Son's and, after examining the scaffold, fitting of the traps, &c., in reply to a question from Mr. Pullen, express himself to the effect that all was fair and just? If he has forgotten the circumstance, I have not, as I was present and heard the conversation.

Did he, after this, rush into print and assert quite the contrary, viz.,—that there was "a space of 18 in. between the plug in the basin and the water-line in the trap"?

Does he remember that, after this, on the 19th of November, I met him at Messrs. Pullen & Son's and distinctly showed him that it momentumed out at 6-in. drop, and that he measured the distance with his 2-foot rule, and acknowledged his error?

Does he remember that he wrote to a contemporary and acknowledged he had made a mistake; but even then (in spite of its having been proved before his eyes and in accordance with his own measurement to be only 6 in.) asserting it was 14 in., thereby virtually stealing 8 in.?

Does he know that Mr. Buchan has also measured this same, and attested to its being only 6 in. instead of 18 in., when it momentumed out?

Does he remember that he wrote, saying:—"Beneath a valve-closet was the safest place to fix a round Ꝺ-trap, and that it will there hold its seal secure"? Your practical readers will, of course, know that the shortest distance between a valve-closet valve and the water-line in a Ꝺ or half Ꝺ-trap, is 10 in., so that I am giving him an advantage of at least 4 in. in my tests. Does he know that Mr. Hellyer has written these words:—"The reason why Beard & Dent's Ꝺ or half Ꝺ-trap is unsuited for fixing under a valve-closet is, that the contents are easily knocked out; it is safe enough to use under the 'Artisan' and wash-out kind of water-closets. The 4-in. patent cast-trap is faulty in form, for its rise to its outlet is much too easy"? By this last it will be plain to everybody that the manufacturer of this trap agrees with me that it is faulty, and yet Mr. E. will persist in contradiction.

Again, your correspondent attacks me on the point of ventilation. I would ask him if he can ever remember my having depreciated its advantages, and does he not know that I have always advocated ventilation as something imperative in sanitation? *De facto*, I consider good ventilation and good trapping the only true key-notes to effectual sanitation.

Mr. E. boldly asserts that "the Ꝺ trap proper has not been introduced at all into these experiments. I understood Mr Davies to say that he had not tried it." Now, I will jog his memory. I most distinctly told Mr. E., in the presence of three other persons, that I had tried the real Ꝺ-trap, and that it was one of Du Bois's patent make, when he replied he always made his pattern trap from one of the same.

In reply to his assertion as to the want of fairness, has not Mr. Buchan, writing to the press, used these words:—"In regard to the mode of conducting the experiments, I consider such fair enough for the purpose,—it is, in fact, more useful than trying them with the water running into the basin all the time the basin is being emptied, *for* although generally the case, in practice it does not always happen"? In this I must agree with Mr. Buchan.

This is not the first time that Mr. Eraptage has challenged the truth of my articles and reports, but as this challenge is put in definite form, I must tell that gentleman that when he is prepared to produce either certificates or indentures (as I am) that he is a civil engineer and plumber (or I will be liberal and let him off with one), I shall be prepared to respond to his challenge, and not till then, any more than would a physician meet a chemist in consultation as a physician.

P. J. Davies, Hon. Mem. A.S.P.

VARIORUM.

A third edition has been published of the "Description of the Chemical Laboratories at the Owens College, Manchester," by Mr. H. E. Roscoe, F.R.S., from the plans of Mr. Waterhouse, A.R.A. (Cornish, Manchester). It includes details of the fittings.——The "Lectures on Architecture," delivered at the Royal Academy by the late E. M. Barry, R.A., have been published by Mr. Murray, and will have attention at our hands in due course.——We may say the same as to a beautiful book, "Raphael, his Life, Works, and Times," just now issued by Chapman & Hall. This is from the French of Eugène Muntz, and is edited by Mr. Walter Armstrong.——Part 7 of "English Etchings" (Reeves, Fleet-street), includes an effective view in the old Cock Tavern, Fleet-street, and two landscapes. The subjects are well printed on good paper, and will hereafter make a nice book. ——Speaking of the newly-built quarter of Ismaileeyah, Cairo, "Egypt, Descriptive and Picturesque," says,—"It has throughout a European aspect, and sprang into life with astonishing rapidity, for the Viceroy gave the building land for nothing to every one who pledged himself to build within a year and a half a house worth at least 1,200*l*. In order to plan wide thoroughfares, the example set by Baron Haussmann in Paris was only too closely followed. Whole quarters of the city were demolished to make way for new ones, handsomer, in the modern European style. The lamentation of the lovers of antiquity over this impious proceeding are only too well justified; but certainly the city has gained in healthiness and pleasantness as much as it lost in venerable and picturesque character, particularly by the construction of very good new aqueducts in the place of the old ones, which were insufficient, by the opening of new canals, and by the abundant planting of umbrageous trees. The most complete transformation was in the Ezbekeeyeh-square. Stately buildings,—some really magnificent,—and among them a theatre, the largest hotels, several Consulates, and the Cairo Bourse, handsome private houses and splendid shops, surround it on every side, and the public garden in the middle is one of the loveliest in the world. One that has more quickly sprung into life and perfection certainly nowhere exists. In the quiet early morning hours the visitor may enjoy a solitary walk under the broad shade of its spreading trees; charmed with the beauty of the shrubs that border the well-kept paths, the growth of every zone; in the afternoon he mixes here with the crowd, listening to the finest compositions of European musicians performed by the Egyptian band,—not forgetting to admire the vegetation that surrounds him, to look into the artificial grottos, and to walk round the large basin in the middle of the garden; and he will find it difficult to believe the fact, when he is assured that this park, now fully grown, was not planned till 1870, by Barilet, the chief gardener of the city of Paris, now lately dead. It is unnecessary to say that such a city as Cairo now is is lighted with gas, and no one who has seen the Ezbekeeyeh lighted up with its 2,500 jets in their coloured tulip-shaped glasses can ever forget that wonderful scene."——From the *Leisure Hour* we obtain the following interesting sketch of "Student Life at Athens":—"Modern Athens is strong in students. Not only do many youths pass through the lower schools and gymnasium up to the University, but the University, being the centre of learning, not for Athens only, but for all the Greek race whether still under Turkish rule or no, and offering an education nearly free to all, attracts to it ambitious young men from Thessaly, Epirus, the Ægean Islands, and Constantinople itself. Hither they come penniless, but athirst after knowledge, take menial situations,—every family has its man-servant, for it is not the custom of the poorest girl to go about alone,—and thus they earn board, lodging, and clothing while they pursue their studies and attend the university lectures. Education, indeed, is a drug in Modern Athens; there is a plethora of educated men. A story is told of a traveller who asked a member of the Government, to whom he had brought a letter of introduction, where he could find a trustworthy Greek attendant to wait upon him and act as guide and interpreter. To his astonishment the minister replied, 'Why not employ my brother? He is just what you need. He is a graduate of the university, speaks several languages, is a civil and obliging fellow, and is anxious for a situation.' There are hosts of graduates looking out for Government appointments, and ready meantime to turn a penny by any employment, however humble. The high esteem in which education is held, the large proportion of public funds devoted to it, and the eagerness with which it is sought and acquired, are among the most striking features of New Greece. The people manifest a natural and instinctive love of learning for its own sake, and apart from its commercial value. The learned professions are accessible to all, and they are overstocked. Literary men abound, and find employment as newspaper writers and *soi-disant* politicians. A practical Englishman would call many of these men 'spoiled artisans.' And, indeed, it is a matter of regret that practical science is not more generally encouraged. But the Greeks have few mechanical tendencies; they are thinkers rather than workers; the brain is their implement rather than the hand. It is to be hoped that the enlargement of their territory, demanding new roads, new bridges, new railways, new harbours, and public works, will stimulate the pursuit of engineering and other mechanical arts."——*The Bibliographer*, a journal devoted to book-lore, is the title of a new monthly serial (Elliot Stock) which promises to supply a want. It will include articles on the public and private libraries of the world, lives of celebrated collectors, a retrospective review of rare, curious, and important books, reminiscences of bibliographers, booksellers, and printers, papers on American bibliography, the history of catalogues and of libraries, marginalia of eminent men, keys to the characters in certain famous books, and many other subjects. The first number is well got up.——The ninth edition of "The Railway and Commercial Gazetteer of England, Scotland, and Wales," now before us, contains a complete list, arranged in alphabetical order, of every town, village, parish, and place in Great Britain, —over 36,000,—and indicates directly the distance from London to each, including the most obscure hamlet, showing also the post-offices, money-order offices, telegraph offices, wherever they exist, in addition to the line of railway and nearest station.

Miscellanea.

Fulham Infirmary.—At last week's meeting the Board considered the question of selecting plans for the new infirmary. Mr. Storey proposed that the authors of five other plans other than those recommended by Mr. Currey, the architect appointed for that purpose, be called before the Board to explain their plans. This was seconded. Mr. Froy moved as an amendment that no other envelopes containing designs for the new infirmary be opened, nor the names of the authors be made known until the Board had decided what plan they should select. This was also seconded, but on being put to the vote was negatived, and Mr. Storey's motion was put and lost. Mr. Froy proposed that the plan recommended by Mr. Currey be adopted, which was seconded. Mr. Rogers proposed the acceptance of a plan the cost of construction from which would be 26,000*l*. After discussion, Mr. Froy's motion was carried. The cost of the building, according to a selected plan, would be about 40,000*l*.

The American Institute of Architects.—The fifteenth annual session of the American Institute of Architects began in Washington on the 16th of November, about fifty members in attendance. The session was mainly devoted to listening to an address entitled "Washington and the Capitol at the Beginning of the Present Century," delivered by Mr. John H. B. Latrobe, of Baltimore, whose father built the Capitol. The address was listened to with the deepest attention.

Ely Palace Chapel.—Another mural painting has just been added to the walls of this chapel in further illustration of English Church History. The subject (treated in oils) is the Martyrdom of St. Alban. The artists, as before, are Messrs. Powell Bros., Park-square, Leeds.

"An Eight Thousand Pound Blunder." In reference to the paragraph quoted by us last week from the *City Press*, it is right to say that at the last meeting of the Court of Common Council, the City Architect, Mr. Horace Jones, in reply to a member of the Court, said, with regard to professional intercourse between the Sewers Office and his own office he could only say that he had no trouble, and was always received by the Engineer with the greatest courtesy and politeness. He did not often go up the stairs himself, but his clerk was always answered with civility, and sometimes the Engineer paid him the honour of a personal visit, and gave him such information and assistance as he might require at his hands. Some twelve or eighteen months ago the Court directed a street to be made from Leadenhall-street to the market. It was necessary for the drainage of the market to put in a sewer, and he understood from inquiry at the Sewers Office that the sewer at that point was only some 14 ft. or 15 ft. deep, but that it was under consideration whether the sewer should be taken eastward up to St. Mary-axe. He had no hesitation whatever in putting himself in communication with the Engineer, who suggested that he should make an application to the Commission to adopt an 18 ft. sewer, and that was afterwards executed. During their conversation he asked if anything was likely to be done with regard to Leadenhall-street, between the new street and the corner of Gracechurch-street. Unofficially it was clearly imported into his mind that there was no likelihood of that, because it was the wrong side of the way. He had had a large plan made, and any one looking at it would see if he drew a straight line from the corner of Cornhill to the corner of the street eastward of the new street up to the market, that the land belonging to the Corporation was in a hollow south of that, whereas if the parallel line were to be carried out on the north side, it would show a very large lump on the north side, and he could never have thought they would suggest the south side instead of the north.

The Brighton Health Congress and Exhibition.—The Exhibition will be opened on Monday afternoon by the Earl of Chichester. The Congress, over which Dr. Richardson, F.R.S., presides, will be opened on Tuesday evening by the delivery of his inaugural address. The sittings of the Congress will be continued every day till Friday. The Congress will be composed of three sections. The first, presided over by Mr. Edwin Chadwick, C.B., relates to the Health of Towns; the second, presided over by Mr. J. R. Hollond, M.A., M.P., relates to Food; and the third, presided over by Dr. Alfred Carpenter, relates to Domestic Health. There will be introductory presidential addresses in each section.

Scaffold Accident: Caution.—An accident occurred at the Phœnix Foundry, Dunfermline, in this way. Six men were standing on a tempory scaffold, 18 ft. high, erected for the purpose of taking down a brick wall which was damaged by the late storm. The bricks were placed on the scaffold as they were removed, and the result was that owing to their weight a cross support broke and the entire structure came down with a terrific crash. All the men were dreadfully injured.

The O'Connell Memorial.—The national memorial statue to Daniel O'Connell, which has been in hand for many years, is now completed, and the colossal bronze casting will leave the foundry of Messrs. Drew & Co., Thames Ditton, shortly for erection in Sackville-street, Dublin. The cost of the memorial is 12,500*l*. The design was by the late J. H. Foley, R.A., and the work has been executed by Mr. Thomas Brock. The memorial will stand at a height of 45 ft. from the roadway.

A New Clock has just been erected in the town-hall at Bilston, Staffordshire. It shows the time upon three dials, each 5 ft. 6 in. across, which are of a new construction; all the figures are burnt upon white opal glass, and the gas by which they are illuminated is turned up and down automatically. All the wheels are of gun-metal, with their teeth machine-cut. The work has been executed by Messrs. Smith, Midland Clock Works, Derby.

Martin's White Lead Company.—This company, as noticed in our advertising columns, has been formed to carry on the manufacture of white-lead. It is claimed that the process, said to be perfected after many experiments, renders the material innocuous, both in its manufacture and use.

Sanitary Institute of Great Britain.—The opening meeting for session 1881-82 was held on Wednesday evening, when the inaugural address was delivered by Dr. Alfred Carpenter. Mr. E. White Wallis, the secretary, read the report of the adjudicators, Dr. B. W. Richardson and Dr. Farr, upon the essays sent in in competition for the Wyatt-Edgell Prize of 200*l*. The subject of the essays was "The range of hereditary tendencies of health and disease," and the successful competitor was declared to be Mr. George Gaskoin, of 7, Westbourne-park. In his address, Dr. Carpenter, in answer to opposition from other existing bodies, argued that there was no antagonism between the Institute and the bodies in question. It had been said that the Institute was antagonistic to the Social Science Association, but he contended that it was the legal offspring of that Association, being the natural result of the teachings of social science. He denied that there was any reason for the antagonism of some members of the Institute of British Architects, and also of some of the surveyors and engineers, pointing out that the Institute in no way proposed to educate and examine men so as to fit them for any of those professions. He urged that there was an important reason why the Institute should be recognised and even supported by the bodies referred to, as neither of them would trouble itself to provide an education, and a test of its appropriation, to the local surveyors in small districts and the sanitary inspectors of the whole of the kingdom.

A Reredos has recently been completed for Frisby Church, near Leicester, by Messrs. Jones & Willis, of Birmingham and London. The reredos proper is of alabaster, and has three panels, the centre one with the figure of our Lord in Glory; the outer panels have carved cusped trefoils, with red marble columns to support caps. The side-wings are of hand-painted tiles.

American Courtesy.—By the last mail it has been notified to Mr. Harry Hems, the sculptor, that he has been elected an Associate of the Society of the Sons of St. George at Philadelphia. This society was founded in A.D. 1771, and is therefore one of the oldest as well as one of the most honourable, in America. Mr. Hems, it may be remembered, was awarded a medal at the Centennial Exhibition of 1876.

The Royal Windsor Tapestry Works.—In connexion with the Royal Windsor Tapestry Works, a central hall and twelve cottages, intended as residences for the *employés*, are about to be erected at a cost of 6,000*l*. on the Crown lands opposite the factory at Old Windsor.

The Export of Deals from Montreal to the United Kingdom during the season of 1881 just closed stood at 38 cargoes, containing 21,838,287 ft. against 19,781,885 ft. in 1880, showing an increase of 2,056,402 ft. when the one year is compared with the other.

The Worshipful Company of Carpenters, at a recent meeting of the court, voted the sum of 1,000*l*. towards the building fund of the City and Guilds of London Institute for the Advancement of Technical Education.

A New Deaf and Dumb Institute, in connexion with the Smyllum Orphanage, Lanark, will shortly be commenced. It has been designed by Messrs. Pugin & Pugin, of Westminster.

Leadenhall Market.—The new Leadenhall-market is, it appears, to be opened on the 15th of December.

TENDERS

For the erection of new premises for the Birkbeck Scientific and Literary Institution, Chancery-lane. Messrs. Fowler & Hill, architects. Quantities supplied:—

	Portland.	Bath.
W. Bangs & Co.	£19,740	£19,709
Higgs & Hill	19,480	18,940
D. Hook	19,476	18,498
W. J. Beale	19,237	18,837
G. H. & A. Bywater	18,974	18,003
Kirk & Randall	18,574	17,820
J. Taylor	18,497	17,517
Peck Bros.	18,250	17,220
J. Bull & Sons	18,220	17,500
J. Mowlem & Co.	17,909	17,282
W. & D. McGregor	17,905	17,262
W. Crockett	17,778	17,490
E. Vaughan	17,736	16,876
Perry & Co.	17,607	16,857
M. Manley	17,603	17,226
J. T. Chappell	17,165	16,560
B. E. Nightingale*	17,045	16,161

* Accepted.

For infants' school, &c., in the rear of Mission Hall, St. Anne's-road, Stamford-hill. Mr. Wm. Jesse F. Scott, architect:—

Shurmur (accepted).

For two new warehouses, Lilypot-lane, City. Mr. W. Wimble, architect:—

Hoare	£3,475 0 0
Hall, Bedall, & Co.	3,114 0 0
Ramsay	3,090 0 0
Brass	2,983 0 0
McLachlan & Sons	2,979 0 0
Faulkner	2,975 0 0
Ashby & Horner	2,945 0 0
Morter	2,873 0 0
Croaker	2,830 0 0

For repairs, &c., to No. 39, Welbeck-street. Messrs. Sandall & Corderoy, architects:—

Williams & Son	£377 0 0
McLachlan & Sons	532 0 0
Burningham	425 0 0
Higgs	392 0 0

For further alterations and additions at Lyndhurst-road Hotel, Hants, for Messrs. Hine Bros. Mr. W. H. Mitchell, architect:—

Stevens & Sons	£1,044 0 0
J. Dyer	958 0 0
Brinton & Born	885 0 0
J. W. Rowland	823 0 0
J. Crook (accepted)	797 0 0

For laying tennis-court and skating-rink with Limmer asphalte, Woolston, Southampton, for Mr. W. Garton:—Bradshaw & Co., Queen Victoria-street (accepted).

For the erection of a large newspaper kiosque in Broad-street, Leek, for Mr. Sam. Rider. Messrs. Sugden & Son, architects:—

For the whole.

Bromage	£135 0 0

Brickwork, &c.

Grave	99 0 0
Hall	75 0 0
Knowles (accepted)	66 0 0

Woodwork.

J. Hudson	95 10 0
Tomkinson	63 0 0
Binley & Morris	61 15 0
Hall	60 0 0
Mackrell	59 10 0
James Hudson	55 0 0
Tatton	50 5 0
H. Carding (accepted)	38 10 0

Plumbing, &c.

W. Carding	23 0 0
Stevenson	20 11 0
T. Johnson (accepted)	19 5 6

For works in New-road, Stoke-next-Guildford, for Mr. John Cable. Messrs. Peak, Lunn, & Peak, architects. Quantities supplied:—

	Pair of Houses.	Stable.
Thos. Swayne, Guildford	£1,750 0	£335 10
Wm. Swayne, Guildford	1,664 10	200 10
Pearce & Clark, Guildford	1,535 0	198 0
Garnett & Mills, Guildford	1,530 0	190 19
Martin, Wells, & Co., Aldershot	1,471 6	193 10
Strudwick, Guildford	1,448 10	199 10
Mitchell Bros., Shalford	1,425 0	195 0
Pink, Milford	1,390 0	171 0
Smith & Sons,* Guildford	1,301 0	178 0

* Accepted.

For new class-room at the Board School, Alfold, Surrey. Messrs. Peak, Lunn, & Peak, architects:—

Foreman, Cranleigh	£270 0 0
Ayling, Wisborough Green	203 0 0
Stevens, Plaistow	164 0 0
Underwood, Dunsfold	154 0 0
Spooner, Alfold Bars (accepted)	148 0 0

For new conservatory, Great Enton, Witley, for Mr. F. E. Eastwood. Messrs. Peak, Lunn, & Peak, architects:—

Martin, Wells, & Co.,* Aldershot	£312 4 6

* Accepted.

For hot-water service at house, stable, and greenhouses, Witley, for Mr. F. E. Eastwood. Messrs. Peak, Lunn, & Peak, architects:—

Rosser & Russell, Charing-cross, in conjunction with Martin, Wells, & Co., Aldershot (accepted)	£438 11 6

For new stabling, "Woodcote," Ashley Park, Walton-on-Thames. Messrs. Peak, Lunn, & Peak, architects. Quantities supplied:—

Martin, Wells, & Co., Aldershot	£396 0 0
Faulkner,* Walton-on-Thames	240 0 0

* Accepted.

For the erection of a villa residence at Robin Hood-lane, Sutton, for Mr. S. R. Nye. Mr. J. Keal, architect:—

J. B. Potter	£580 0 0
H. Keal	540 0 0
J. Arney (accepted)	525 0 0
H. Winter	510 0 0

For alterations to the Green Man, Leytonstone, for Mr. A. S. Angiss. Mr. J. G. Needham, architect:—

Jackson & Todd	£545 0 0
Walker	475 0 0
Skipper	475 0 0
Marr	449 0 0
Hawkings (accepted)	436 0 0

For building new baths in the rear of 574, Mile-end-road, for Mr. Bluemell. Mr. C. Legg, architect. Quantities by Mr. W. Hawker:—

Parish	£635 0 0
Hawkings	579 0 0
Judd	487 0 0

For the erection of a pair of villa residences, South Park, Wimbledon. Mr. Fred. C. Notley, architect:—H. & E. Smith, Balham (accepted)... £1,375 0 0

For new works for the Bedford Ironworks Company. Messrs. Usher & Anthony, architects. Quantities supplied :—

Higgs & Hill, London	£8,980 0 0
S. & W. Pattinson, Sleaford	6,978 0 0
Wood & Son, Leicester	6,624 0 0
Warton & Walker, Bedford	6,393 0 0
Harrison, Bedford	6,370 0 0
Adams, Bedford	6,261 0 0
Potter, Bedford	6,100 0 0
Claridge, Banbury	6,053 0 0
Edey & Wade, St. Neot's	6,000 0 0
S. Foster, Kempston (accepted)	5,987 0 0

For boundary-walls, fences, gates, and the laying out of a new cemetery, at Potton, Beds., for the Potton Burial Board. Messrs. Usher & Anthony, architects :—

Edey & Wade, St. Neot's	£482 17 0
S. Foster, Kempston	331 0 0
Bartle, Potton	289 10 0
Woodman, Potton	266 0 0
Barnage, Potton (accepted)	263 5 0

For vagrant wards, Market Rasen. Messrs. Bellamy & Hardy, architect :—

Chris. Wallis, Caistor	£1,552 4 3
Nightingale & Danby, Grimsby	1,480 17 7
Walter & Hensman, Horncastle	1,428 0 0
Jolland Chapman, Grimsby	1,421 4 0
G. Dent, Brigg	1,370 0 0
T. Wilson, E. Markham	1,369 0 0
C. Sanderson, Market Rasen	1,256 0 0
Malam & Freeman, Market Rasen	1,254 13 1
T. H. W. & H. Wallis, Spalding	1,239 0 0
C. Kendal, Market Rasen	1,235 15 0
J. Harrison, Market Rasen	1,210 0 0
Chas. Brownlow,* Market Rasen	1,209 11 0

* Accepted.

For new hall and offices in the Southwark Bridge-road, for the Bricklayers' Society. Messrs. A. & C. Harston, architects :—

Brass	£5,110 0 0
Wall Bros.	5,050 0 0
Goodman	4,480 0 0
Hall, Beddall, & Co.	4,445 0 0
Kilby	4,400 0 0
Shurmur	4,095 0 0
Crockett	3,846 0 0

For alterations and additions at the King's Head public-house, Buckingham Palace-road, for Messrs. Watney & Co. Mr. C. W. Bovis, architect. Quantities supplied :—

Clarke & Bracey	£1,225 0 0
Hockley	1,218 0 0
Wilks Bros.	1,180 0 0
Anley	1,180 0 0
Axford	1,175 0 0
Spencer & Co.	1,115 0 0
Pinnegar	888 0 0

For alterations and additions to the Duke of Clarence public-house, Rotherfield-street, Essex-road. Mr. George W. Fisher, architect :—

S. Row	£306 0 0
J. Clinch	298 0 0
Dearing & Son	285 0 0
Styles	269 0 0

For draining and making up roads at Strode-street, Denham-road, and Hummer-lane, Egham. Mr. P. J. Byrne, surveyor :—

Squeleb*	£303 10 0
Baigent	259 16 0
A. L. Oades† (drains only)	112 0 0

* Accepted for roads. † Accepted.

For four shops, Windsor, for Mr. G. H. Long, J.P. :—

J. Norris	£792 0 0
W. Willis	718 0 0
W. Woodbridge	680 0 0
H. Gray	630 0 0
McQuhae	627 0 0
F. Akery	615 0 0
W. P. Reavell (accepted)	592 0 0

For alteration and additions to the Jolly Farmers, Staines, for Mr. J. F. Harris. Messrs. Low & Birch, architects :—

J. Higgs, London (accepted).

For alterations and extension of premises, The Grange, Bermondsey, for Messrs. Samuel Barrow & Brother. Messrs. Elkington & Son, architects. Quantities by the Architects :—

Buller	£475 0 0
Wells	383 0 0
Eldridge & Gee (accepted)	348 0 0

For alteration and addition to No. 64, Aldermanbury, for Mr. G. L. Turney. Mr. A. Peebles, architect :—

Colls & Sons	£1,340 0 0
J. & J. Greenwood	1,275 0 0
Downs & Co.	1,175 0 0
C. Goad	1,143 0 0
Bird	1,011 5 5

For alterations and additions to No. 10, Lower Seymour-street, W., for Mr. Batt. Mr. Sancton Wood, architect :—

F. Sanden, New-street	£1,355 0 0
Stimpson & Co., Brompton	1,316 0 0
J. Higgs, Upper Park-place, N.W.	1,195 0 0

For alterations and additions to the Sarata Oil Works, Rotherhithe New-road, for Mr. Sterry. Mr. E. Saunders, architect :—

J. Higgs (accepted).

For further works in the erection of stores, cellars, &c., for Messrs. Wright Bros., at their new brewery, Leeds. Messrs. Davison, Inskipp, & Mackenzie, architects :—

Boothman & Son	£915 0 0
Irwin & Co. (accepted)	855 0 0

For alterations to entrance gates and raising boundary-wall at Homerton Hospital, for the Managers of the Metropolitan Asylums District Board. Mr. John Walker, architect :—

Shurmur (accepted).

TO CORRESPONDENTS.

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